SCORE! Sustainable Consumption Research Exchange

Proceedings: Refereed Sessions I-II

Sustainable Consumption and Production: Framework for Action

2nd Conference of the Sustainable Consumption Research Exchange (SCORE!) Network

Monday 10 and Tuesday 11 March 2008, Halles des Tanneurs, Brussels, Belgium

Edited by:Theo Geer Ken (VITO) , Arnold Tukker (TNO) , Carlo Vezzoli and Fabrizio Ceschin (Politecnico di Milano)

www.score-network.org

Organisation:

Flemish Institute for Technological Research (VITO), Mol, Belgium, and TNO, Delft, Netherlands, with support of the EU's 6th Framework Program, and endorsed by UNEP and IHDP-IT

The conference is organized in support of the UN's Ten Year Framework of Programs on Sustainable Consumption and Production,

Industrial Transformation

SCORE! Sustainable Consumption Research Exchange

Sustainable Consumption Research Exchanges (SCORE) is funded by the European Commission under the 6th Framework Program

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February 2008

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Chapter 1 Towards "Human Development through the Market"

A Comparative Review of "Sustainable Business Approaches" from a Sustainable Consumption and Production Perspective

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Abstract

This paper looks at the description of "Human Development through the Market approach (HDtM)". HDtM, a sustainable business approach, is a reaction to the missed links and the untapped opportunities of sustainable consumption and production (SCP) concepts in BoP markets. SCP practices protect and restore eco-systems on which the poor depend for their livelihoods, while at the same time discovering innovative products and services and increasing companies' innovation capacity. Meeting the essential challenge of SCP requires rethinking of current business models together with how consumption problems (such as access, resource use and environmentally friendliness, inter-sectoral linkages) can be systematically addressed beyond technological solutions and with political determination. This paper analyses eleven sustainable business approaches with the objective of finding the missing elements and understanding their core strengths from the SCP perspective. The analyses of these business approaches have shown their different scope and depth. Some have aimed at addressing flaws in framework conditions while others intervened to create markets for certain products and services. Some have clear principles for businesses to develop while some lack clear business procedures. Common to all, two characteristics are not touched by every approach: monitoring and evaluation schemes and encouragement of sustainable consumption and production patterns. HDtM as a distinct approach aims at building upon these learning outcomes.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

1 Introduction

Despite being trapped by market failures, businesses, without doubt, can make significant contributions to economic growth as employers, product and service providers, or taxpayers. Yet, the question of what type of development they indeed strive to contribute to or, in other words, how poverty traps are understood and interpreted by businesses, still remains to be discussed. Businesses with a modern worldview would cleverly reckon that in this new century, challenges facing societies are multi-faceted and interlinked. Among all, poverty being a socio-economic issue is very much linked to environmental issues (CSCP and UNEP, 2006). In a business company successful management of sustainability performance is achieved only if the management of environmental and social issues is in line with increased competitiveness and economic performance (Schaltegger and Wagner, 2006, Ellington, 1994).

The aim of this paper is to introduce the background for Human Development through the Market approach (HDtM) and its basic principles. HDtM is building its foundations on the strengths and learning's from similar business approaches. Hence, this paper reviews so called sustainable business approaches from the perspective of sustainable consumption and production with due emphasis for the social dimension of sustainability.

1.1 Connecting the dots and doing the trick

Livelihood strategies and food security of the poor often depend directly on functioning ecosystems and the diversity of goods and ecological services they provide. They often derive a significant amount of income that supports their livelihoods – either in cash or for direct use – from local eco-systems (CSCP, a2006). The dependency of livelihoods on the environment can become a problem when environmental degradation occurs. Every human-caused environmental problem connects to consumption and production. As a result, sustainable consumption and production (SCP) practices that protects or restores eco-systems on which the poor depend for their livelihoods leads to immediate and tangible benefits for the poor.

The goal of SCP is to balance environmental, social and economic goals. By conducting business with poor and interacting with them, SCP strategies discover innovative products and services and increase companies innovation capacity, (CSCP a2006). Poverty eradication and social issues have clear linkages with the sustainable consumption and production agenda (CSCP a2006). Sustainable consumption and production is an area in which innovation and leadership is possible for both sustainability and poverty alleviation agendas.

Entrepreneurs who recognise the close linkage between fair and efficient use of natural resources and development opportunities could bring a fresh thinking into markets i.e. beyond the sole concern for economic growth. Such entrepreneurs obviously would be in need of favourable framework conditions, such as policy instruments encouraging and awarding their contribution.

This needs new ways of thinking beyond the business practices in the west where impactful lifestyles are caused by locked-in infrastructures, resource intensive products and fossil-fuel based economic growth. Leapfrogging strategies can assist developing countries to meet their basic needs and achieve an alternative economic development, while preserving

environmental resources they have. It can help to set-up a sustainable infrastructure and establish sustainable markets where low-income communities can develop their own livelihoods, either taking the role as producers and/or consumers (see Box 1 for a more detailed perspective).

Box 1: Providing sustainable solutions to the BOP markets in major impact areas (N stands for the 'North' and S stands for the 'South').

The SCP agenda possesses high potential for contributing to poverty alleviation. The thinking behind SCP can provide opportunities to shift the classic understanding of poverty and demonstrate why it is necessary to bypass the high-resource intensive development path the Western nations have gone through. For example, food and drink sector, mobility services and housing sector lead to the highest impact level in terms of many environmental issues such as global warming, acidification, photochemical ozone formation, and eutrophication (EIPRO-Study 2006). Utilization of learnings and experiences from the West in resource management is essential for the South. Alternative development paths can potentially be pursued in areas, which have been identified as sources of high environmental impacts and high resource use by the West (see Figure 1).

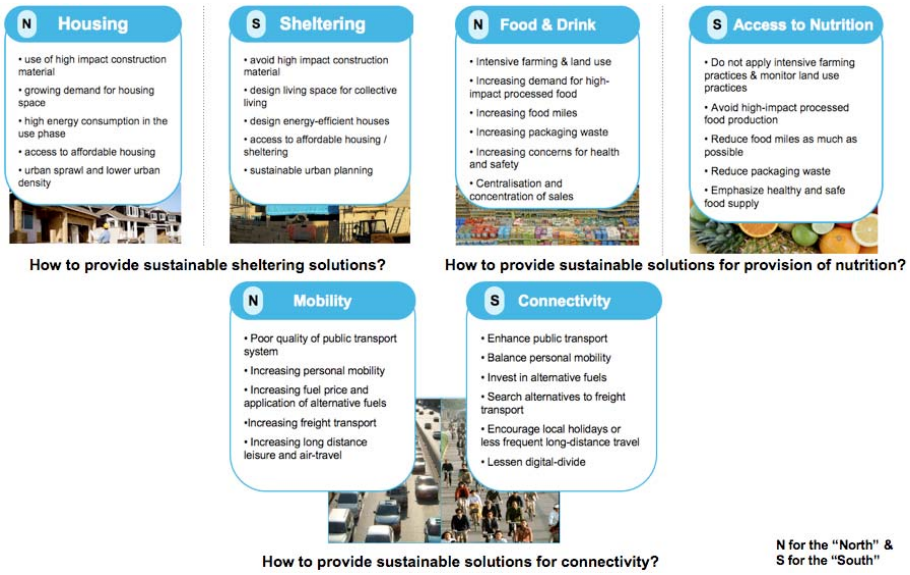


Figure 1: Providing sustainable solution to the BOP markets in major impact areas (N stands for the 'North' and S stands for the 'South').

In this respect, the HDtM approach, which is also supported by UNEP, is an essential heuristic to detail what these new sustainable business models might look like. The aim of this article is to introduce the background for the HDtM and its basic principles. The HDtM is building its foundations on the strengths and learning's from similar business approaches targeting the base-of-the-pyramid.

2 Motives and particularities of sustainable business approaches targeting the base-of-the-pyramid (BOP) markets

What types of market-based approaches and strategies targeting sustainability are there? What are the success factors and weaknesses mostly mentioned in the literature? Seeking a strong base for the HDtM approach, these questions have constituted a starting point for elaborating the HDtM heuristic. We strived to collate business approaches and initiatives seeking to serve low-income markets and sustainability. We have found eleven significant approaches. We do not claim that this collection is all-inclusive. Our pursuit focused on the most commonly mentioned concepts and approaches, while theoretical constructs have been left out.

Having the objective of finding the missing elements and locating the strengths, a thorough understanding of the motives behind the approaches, their differences, and what they thrive to achieve is in the first place quite essential. Despite having set a similar objective of sustainability and poverty alleviation, each approach differs in its roots, core philosophies, partnerships, framework conditions and methodological means. This section delivers brief description of each one of the eleven approaches in clusters.

2.1 Striving to create social and environmental value: Social Entrepreneurship and Ecopreneurship

Aiming at either ‘creative destruction’ (Schumpeter, 1950) across markets or ‘taking risks’ (Drucker, 1970) in the name of an idea, entrepreneurs try to find solutions to most pressing problems of society, often a particular community, and deliver goods and services currently not supplied by existing markets (SustainAbility, 2007. As such, social entrepreneurship prioritizes social returns on investment, whereas environmental entrepreneurship prioritizes environmental returns on investment.

The language of social entrepreneurship is new, but not the phenomenon, because social entrepreneurship is a practice that integrates economic and social value creation has a long heritage and a global presence. Its concept has been rapidly emerging in the private, public and non-profit sectors over the last few years, and interest in social entrepreneurship continues to grow. In his article “The Meaning of Social Entrepreneurship”, Dees remarks: “Though the concept of Social Entrepreneurship is gaining popularity, it means different things to different people” (Dees 2001). According to Fowler (2000) social entrepreneurship is the creation of viable (socio-) economic structures, relations, institutions, organizations, and practices that yield and sustain social benefits. The Institute for Social Entrepreneurs (2002), on the other hand, defines social entrepreneurship as the art of simultaneously obtaining both a financial and a social return on investment. The Canadian Centre for Social Entrepreneurship also focuses on innovative dual bottom line initiatives emerging from the private, public and voluntary sectors (CCSE 2001). The ‘dual bottom line’ refers to the emphasis placed on ensuring that investment generates both economic and social rates of

return. The dominant conceptualization of the subject suggests that social entrepreneurship can take a variety of forms, including innovative not-for-profit ventures, social purpose business ventures and hybrid organizations mixing for-profit and not-for-profit activities (Dees, 2001).

Christian Seelos and Johanna Mair from the University of Navarra (Spain) report that Social Entrepreneurs build hope and optimism from the ground up by focusing on what is achievable locally, rather than trying to implement global 'best practices' (Mair and Seelos, 2005). However, spreading social innovations into new locations or markets, and scale up of impacts into significant social changes are by far remain as some of the most challenging issues of most social entrepreneurs (Anderson et al 2002).

On the other hand, the term 'ecopreneurs', also known as environmental entrepreneurship or eco-capitalism, has been coined for entrepreneurs whose business efforts are not only driven by profit, but also by a concern for the environment. Anderson and Leal (1997) define ecopreneurship as "entrepreneurs using business tools to preserve open space, develop wildlife habitat, save endangered species, and generally improve environmental quality".

Environmental entrepreneurship as a business approach challenges the hidden and tenuous assumption that environment and economy conflict each other in all walks of life. This is a misconception that results from the imagined fact that every environmental problem results from a conflict between a marketed resource with monetary value (for example, timber) and a non-marketed resource with intrinsic value (for example, scenic beauty).

Free market environmentalism calls for the privatization of every environmental assets including those do not seem to be privatized like oceans, seas, lakes, streets, air etc. In addition, some free-market environmentalists do believe that privatization is the best solution to public land controversies. But privatization is neither necessary nor sufficient to improve public land management. Free market environmentalism considers government regulation usually as the reason why markets do not exist. They believe that decentralized tools such as user fees, incentives, and markets can solve environmental problems better than centralized tools such as subsidies, bureaucracy, and regulation. Terry L. Anderson and Donald L. Leal, who are the fore runners in the field of free market environmentalists, among others believe that market approaches can be both economically sound and environmentally sensitive (Anderson 2006).

However, environmental entrepreneurship is a young discipline, with much work remaining to be done. In the current public discourse of the concept the social component of sustainability issues is not explicitly indicated and the approach may have some weakness in addressing sustainability with the triple bottom line focus.

2.2 Multinationals' contribution to poverty alleviation: Bottom of the Pyramid (BoP) Protocol, Make Poverty Business and Sustainable Livelihoods Business

Several initiatives focus on the potential of multinational companies to positively contribute to development issues by addressing the poor either as consumers or producers. Among all, the BoP Protocol has emerged as a

business incubation process that enables multinational corporations (MNCs) to generate new business opportunities at the Base of the Pyramid (Prahalad and Hart, 2002). In short, the BOP posits that: 1) There is an untapped economic potential at the bottom or base of the global market pyramid; 2) Private companies can, by selling to the poor, bring them prosperity and help alleviate poverty. C.K. Prahalad asserts that introducing market choice to the poor will free villagers from local monopolists, creating a virtuous cycle of consumer access and improved product quality (Prahalad, 2004); and 3) Large companies, multi-nationals (MNCs) and trans-nationals (TNCs), should play the leading role of selling to the poor (Prahalad and Hart, 1999). Although the BoP proposition promises to serve the poor and help alleviate poverty it has some drawbacks. The concept of BoP views the poor as consumers and not as producers; Karnani asserts that "rather than focusing on the poor as consumers, we need to view the poor as producers. The only way to alleviate poverty is to raise the real income of the poor" (Karnani, 2006). The BoP proposition also lacks focus on other alternative economic paths, such as those considered by local development agencies (Alves 2006); finally, it relies on pure market mechanisms where governments are not explicitly involved, and thus can be a victim of market imperfections and failures. Recent disagreements over how – or even whether – BOP propositions can successfully be accomplished (Karnani, 2007a, 2007b, 2007c) confirms that much work remains to de done, especially in theoretical development and empirical analysis.

"Make Poverty Business" is based on one of the common critiques on the Prahalad's and Hart's (2002) BoP proposition, which is its focus on turning the poor into consumers without consideration of their roles as active economic agents (Karnani, 2007). Craig Wilson and Peter Wilson (2006) explain in the book entitled "Make Poverty Business" a strategic view of all the ways in which a multinational company can interact with and influence the lives of the poor. "Make Poverty Business" proposition argues that doing business with the poor can be profitably integrated into the core operations of expatriate managers within their host country. It firmly believes corporate social responsibility (CSR) frameworks might eventually do more harm to a local community than contributing to its developing, since CSR has a strong risk management focus.

The World Business Council for Sustainable Development (WBCSD) is exploring through its Development Focus Area, and specifically via the Sustainable Livelihoods Project (WBCSD, 2002), how its member companies are beginning to do business with the poor in ways that both benefit the poor and benefit their companies. WBCSD's initial Sustainable Livelihoods field guidebooks (WBCSD, 2004a/b/c) showcase business models being developed by member companies investing in the developing world, illustrates ways for accessing capital and collate a wide range of partners available to businesses within the development community. Based on its initial efforts, the WBCSD has recently created a strategic alliance with the SNV Netherlands Development Organization entitled "Inclusive Businesses" in order to focus its efforts in the field. This approach seems to cover the BoP markets both as producers and consumers, as it refers to direct employment of the poor, targeted development of supply chains and provision of affordable goods and services. Mobility and energy for development and measuring impacts are set to be promising priority areas

(WBCSD, 2007b). As the WBCSD is strongly encouraging its members to think differently about development in its publications, the questions of whether the ambition is really about going beyond corporate social responsibility activities (i.e. within supply chains of corporations and in connection to communities providing raw materials) and challenging the resource intensive consumption patterns with disruptively innovative business solutions remain open. It seems instead to reflect the corporate world's interpretation of value chain promotion strategy proposed by development agencies.

2.3 Development agencies' perspective: Local/Regional Economic Development (LRED) and Value Chain Promotion

A whole variety of approaches to address poverty alleviation and sustainability are put forward by development agencies. Among them the local/regional economic development strategy (LRED) and the value chain (VC) promotion tool seem to place most emphasis on environmental and social value creation. These approaches are well documented and widely used by various development agencies including financial institutions such as the World Bank.

LRED is a strategy to promote local and regional economies. The main objectives of the LRED approach are creating favourable framework conditions for business at a particular location, removing administrative obstacles, enhancing the competitiveness of the location to attract new investors, and strengthening local enterprises and business cycles. LRED enables stakeholders of a region to undertake initiatives to jointly promote economic development of their region by establishing linkages between the private and public sectors and interest groups of civil society. Local development strategies are based on the region's economic potential, resources and institutional conditions. A related and even more localized concept is "communal economic promotion" (GTZ 2007). The Swiss Agency for Development and Cooperation (SDC) believes that the ability of communities to improve quality of life, create new economic opportunities and fight poverty depends upon them being able to understand the processes of LRED, and act strategically in the changing and increasingly competitive market economy.

Value chain (VC) promotion harnesses market forces to achieve development goals. It is a set of action-oriented methods for promoting economic development with a value chain perspective. It provides essential know-how on ways to enhance employment and business income of micro and small-sized enterprises, such as farmers, by promoting the value chains they are operating in. However, VC promotion as a business model for a particular entrepreneur has still not been well elaborated. Therefore, VC promotion is essentially a development approach and needs to be clearly distinguished from supply chain management. While value chain promotion takes a public perspective, supply chain management aims at optimising the logistics of input sourcing and marketing – from the perspective of a particular lead company. While supply chain management is concerned with logistics, value chain promotion is about market development. (GTZ, 2007). A major advantage of VC promotion, like other development approaches, is that they manage to establish links to local or national development policies.

For example, “Making Markets Work for the Poor” (MMW4P), a project supported by ADB and DFID, focuses on broader market development and poverty eradication, while it puts ‘policy dialogue’ at the core of its objectives. Yet, bridging to policy work on resource conservation, tackling of climate change or, not even to mention, encouragement of sustainable consumption patterns is very weak or absent. Hence, success is very much single factored and based on the degree of access to global markets.

2.4 Addressing inequalities through partnerships: Fair Trade movement

‘Fair trade’ can be considered as a social movement. Behind it is a global market of individuals, corporations and NGOs that seek to find an equitable means of trading by forming “partnerships based on dialogue, transparency and respect that seek greater equity in international trade and better trading conditions” (Trends in Fair Trade 2003, King Baudouin Foundation, undated) or “an alternative livelihood for small producers, generating a new source of income and employment” (Oxfam Fair Trade, undated). Fair trade is entirely a consumer choice model; it departs from the free trade model not by introducing governmental frameworks, but voluntary considerations of consumers as a regulating force. fair trade represents a market-driven response to trade inefficiencies and inequalities. By redefining purchase utility in terms of a holistic view of the supply chain – specifically by reconnecting producer and consumer interests – fair trade has positioned trade justice as a premium brand value for many customers (Nicholls and Opal, 2005) and can bring real economic value to unequally treated BoP markets. For example, TransFair USA estimated that, in five years of activity in the USA, fair trade has returned over £16.8m to coffee farmers in developing countries above what they would have received in the conventional market (TransFair USA, 2004). Some neo-liberal economists have voiced objections to the fair trade model. For example, they argue that the use of a price floor in the fair trade model is a fundamental hindrance to the efficient functioning of the free market. By keeping prices high through the fair trade price floor mechanism, farmers and producers cannot sell their surplus bumper crop because there are not enough willing buyers at the high price. The result is wasted produce that could have been sold had the price been allowed to be lower, known as a ‘dead weight loss’. Leading scholars in the field and pro fair trade advocators like Dr Alex Nicholls from University of Oxford admitted that it is true that a price floor imposed on the entire market can in theory lead to excess supply, and as the fair trade market share continues to grow, the price floor will eventually have some effect on the world market price and thus create distortions. But for the time being the reality is that fair trade cannot be ‘price-setting’, because 99 per cent of world trade still operates under free market principles.

2.5 Business management tools: Sustainable Supply Chain Management, Sustainable Design and Product Service Systems (PSS)

Several business strategies and management tools might as well constitute a platform to address environmental and social issues.

Working with suppliers and supply chain issues is rapidly increasing as an important strategic consideration. For enterprises, one of the challenges is to make linkages in the product chain in such a way that there is focus on

both the environmental optimisation of the material flow in the supply chain; and on the customer's expectations regarding environmental and social issues in the value chain (UNEP, 2007). Enterprises can utilize several tools for better sustainable supply chain management such as economic instruments, substance bans, voluntary agreements, environmental labelling, product design guidelines and codes of conduct for suppliers (New Zealand Business Council for Sustainable Development, 2004). Success of these tools depends on partnerships between suppliers mostly located in the developing world and their customers in the developed world (A Nordic Partnership 2004).

Sustainable supply chain management includes social issues that link directly to matters of poverty such as agreement on minimum wages, health and safety of workers, child labour and worker education. Capacity building and improvement of social and environmental conditions can help to improve the livelihood of the poor and eventually contribute to poverty alleviation. However, as the nature of sustainable supply chain management tools exhibits, these strategies often serve corporate risk management in relevant countries of operation. The link to poverty alleviation stays weak and is not seen to be primary.

Another approach falling into this category is sustainable product design, also known as Design for Sustainability or D4S. Companies might incorporate environmental and social factors into product development throughout the life cycle of the product, throughout the supply chain, and with respect to their socio-economic surroundings (UNEP/TUDelft 2006). D4S goes beyond how to make a 'green' product - the concept now embraces how best to meet consumer needs – social, economic and environmental - on a systematic level. This process involves designers, industry, marketing people, retailers and consumers.

Product Service System (PSS) has also emerged as a novel product development perspective and can be defined as a system of products, services, infrastructures, and networks of actors that brought together to develop a system that is competitive, satisfies customers and that has lower environmental impact than traditional business models (Mont 2005). The system includes product maintenance, parts recycling and eventual product replacement, which satisfy customer needs competitively and with lower environmental impact over the life cycle. Therefore, as UNEP (2004) describes, PSS require a coordinated approach by several groups of stakeholders. PSS solutions are often more complex to develop, involving more elements to design and to develop than a typical product-based system (Wong 2005). PSS research began in the mid 1980´s and progressed at a rather quick pace through the 1990´s (Gunjima 2005). To date, despite the potential contribution of service-based thinking to poverty alleviation is very much indicated by researchers, beyond ICT sector cases PSS applications are limited.

As we have learned from the discussion, the eleven business approaches and models presented in this section are quite diverse in their strategies and the main actors it involves. Experiences and outcomes of their efforts to reduce poverty and ensure sustainability to date are mixed. The central characteristics of each approach are summarised in Table 1 below.

Table 1: An overview of business approaches targeting low-income markets.

Business Approach	Definition	Purpose/Lead Actors[1]	School of Thought/Org. that promote the model
Social Entrepreneurship	- "The art of simultaneously obtaining both a financial and a social return on investment" (The Institute for Social Entrepreneurs, 2002). - Social Entrepreneurship is the creation of viable (Socio-) economic structures, relations, institutions, organizations, and practices that yield and sustain social benefits (Fowler, 2000)	- Creating social value through entrepreneurship. (Dees, 2001). - Local Entrepreneurs are the lead actors.	- Organizations: (such as Ashoka: Innovators for the Public, the Skoll Foundation, Schwab Foundation). - Business schools: (like Duke University - Fuqua School of Business, University of Oxford - Saïd Business School, Alberta University - School of Business, - Researchers: (like William Drayton, Dees J. G., Anderson, B.B, Fowler, A, Seelos, C., Mair, J., Thompson, J.L)
Environmental Entrepreneurship	"The practice of creating a healthier environment by making wise business choices" (Greenproofing.org, undated)	- Creating healthier physical environmental choices (Greenproofing.org, undated). - The lead actors are entrepreneurs (local, regional and international).	- Environmental think-thanks: [such as Political Economy Research Centre (PERC), Foundation for Research on Economics and the Environment (FREE)]. - NGOs: (like The Green Institute) - Environmental School: (such as The City College of New York).
Value chain promotion	A value chain is an economic system that can be described as a sequence of related business activities (functions) from the provision of specific inputs for a particular product to primary production, up to the final sale of the particular product to the consumer (GTZ ValueLinks Module 1, 2007).	- Harnessing market forces to achieve development goals (GTZ ValueLinks Module 0, 2007). - The private sector is the driver of the system.	Development agencies, mainly GTZ.
Local/Regional Economic Development (LRED)	- LRED is a process by which public, business and non-governmental sector partners work collectively to create better conditions for local economic growth and employment generation. (The World Bank et al 2004).	- Creating conducive framework conditions for business at a particular location (Swiss Agency for Development and Cooperation 2006). - The lead actors are public institutions, private enterprises and Civil society of a particular region.	Various development agencies, including World Bank.
BoP Protocol	The BoP Protocol is a business incubation process that enables multinational	- Enabling multinational companies to generate new business opportunities at the BoP and it also lifts people	The front runners are professors Stuart Hart and C.K. Prahalad

[1] Lead actor (s) is the stakeholder who plays the major and the largest role in the process of the approach.

Business Approach	Definition	Purpose/Lead Actors[1]	School of Thought/Org. that promote the model
	corporations (MNC) to generate new business opportunities at the Base of the Pyramid (Hart and Simanis, 2003).	out of poverty (Prahalad and Hart 2002) - MNCs are the lead actors.	
Make Poverty Business	It is using a poverty perspective to provoke profitable innovation.	- Making argument for multinational corporations to do more business with the poor. - The lead actors are multinational companies	The front-runners are Craig Wilson and Peter Wilson.
Sustainable livelihoods (SL) business	Sustainable livelihoods (SL) business is doing business with the poor in ways that simultaneously benefit disadvantaged communities and benefit the company. (WBCSD, 2004a).	- Creating benefits both to disadvantaged communities and business companies. - The lead company in a supply chain is the main actor.	World Business Council for Sustainable Development (WBCSD)
Fair trade	- Fair trade is a trading partnership, based on dialogue, transparency and respect, which seeks greater equity in international trade (FINE, 2001) - Fair trade is "a free trading regime with some agreements between trading partners on wage standards and social regulations" (Hudson, 2003).	- Finding an equitable means of trading by forming partnerships based on dialogue, transparency and respect that seeks greater equity in international trade and better trading conditions (Trends in Fair Trade, 2003)- - It is a customer based approach.	- Fair trade Labelling Organisations: [like Fair trade Labelling Organizations International (FLO)], - Social and environmental organizations: (such as Oxfam. Amnesty International, Caritas International)
Sustainable supply chain Management (SSCM)	Sustainable supply chain is "Management of raw materials and services from suppliers to manufacturer/ service provider to customer and back with improvement of the social and environmental impacts explicitly considered". (New Zealand Business Council for Sustainable Development, 2003).	- Reducing social, environmental and economic impacts in a company's interactions with its customers and sales channels (Nordic partnership SSCM, 2004). - The lead company in a supply chain is the main actor.	UNIDO, UNEP, Nordic Partnership Sustainable Supply Chain Management, New Zealand Business Council, Institute for Supply Management, trade and industry associations and many multi-national companies.
Sustainable Design	It is a way in which companies incorporate environmental and social factors into product development throughout the life cycle of the product.	- Designing goods and services that take into account all the dimensions of sustainable development. - Manufacturers and producers are the main actors.	United Nations Environment Programme (UNEP), Dutch Delft University of Technology, The Centre for Sustainable Design (UK), Companies like PHILIPS electronics.
Product Services Systems (PSS)	A system of products, services, infrastructures, and networks of actors that brought together to develop a system that is	-Reducing environmental load through economic activity of private business. - In the network the lead actors are manufacturers and	UNEP, research centres like Institute for Global Environmental Strategies (IGES), Tellus Institute (USA), and International Institute for

Business Approach	Definition	Purpose/Lead Actors[1]	School of Thought/Org. that promote the model
	competitive, satisfies customers and that has lower environmental impact than traditional business models (Mont, 2005).	producers	Industrial Environmental Economics (IIIEE) at Lund University.

3 Evaluating the challenges and capabilities of sustainable business approaches

This section discusses the evaluations of the sustainable business approached described so far based on a set of criteria. These have been drawn on four different aspects—development studies, organization theory, social movement research, and SCP thinking. Development studies focus on the economic, social, and political challenges of social change; on the nature of development problems and the kinds of innovations required to solve them; and on the importance of building local capacity to sustain improvements (Brown, 2000). Organization theorists examine the special characteristics of the business concerned with catalyzing social change and development, such as their visions, missions, and strategies; their organizational architectures; and their capacities to learn from experience in changing contexts (Hailey, 2001). Social movement researchers examine the attributes of collective action to redress social problems, examining issues such as political opportunity structures, resource mobilization, movement identity formation, and political strategy and tactics (Tarrow, 1998). We will draw on these and other perspectives in focusing attention on six basic aspects of the sustainable business approaches: 1) Concrete procedures for effective management (Concrete procedures, Scaling up capacity); 2) Supporting public policy efforts (International justice, Advocacy for international and local public policy); 3) Focusing at the triple bottom line; 4) Empowerment of the poor and local value creation; 5) Fostering partnership model (poor and marginalized people, resource providers, and other allies who help carry out programs); and 6) Encouraging sustainable consumption patterns.

3.1 Concrete procedures for effective management

Market-based approaches that benefit businesses while helping the poor require the realisation that the rules are different so people should rethink (UNDP, 2006) internal structures, new resources and capabilities would need to be put in place, existing value chains must be redesigned, cooperative strategies have to be realigned and as well marketing management requires adaptation (Kirchgeorg and Winn, 2006). Therefore, an approach should be evaluated on the basis how much it demonstrates concrete and clear procedures for the entrepreneur to tackle these challenges.

Moving into new locations or markets is by far the crucial part of market-based approaches. However, as Dees together with Anderson and Wei-Skillern (2004) point out, many powerful programs started with the idea of serving as a ‘pilot’ or ‘model’ that could be replicated around the country. Therefore, the market-based approach should provide general principles that

could inform an organization's scaling capacity-building strategy.

In this regard social entrepreneurship has a low profile. Spreading social innovations into new locations or markets, and scaling-up of impacts into significant social changes remain some of the most challenging issues of most social entrepreneurs (Anderson et al, 2002). The organizational and institutional features of environmental entrepreneurship are also weak and, as Uphoff, et al., (1998) argue, initiatives face the challenges of expanding their impact and for sustaining their businesses organizational and institutional features are important factors. VCP, LRED, PSS , and MPB also do not demonstrate strong management systems for the entrepreneurs. In contrast, fair trade, Sustainable Livelihoods (SL) business, and the BoP Protocol provide better management systems. Fair trade has the capacity to work with and build bridges among very diverse stakeholders. However, as in the future it might affect the efficient functioning of free markets (Nicholls 2006), it might face difficulties responding to major contextual challenges. As large companies are the leading actor of SL approach, it has good organizational and institutional features to scale up its social impact so long as there is profit to be made. However, marketing with the poor requires the experience to work with and build bridges among very diverse stakeholders that could serve a widely distributed need. It also needs long-term adaptive capacity to successfully catalyze initiative adaptation to local changes. The specific concern that BoP seeks to address is poverty alleviation (Prahalad, 2005) in less developed countries (LDC). However, the existing BoP model is not well developed to support adequately its claim of poverty eradication. The BoP preposition also could not clearly bring Monitoring and Evaluation to be the affirmative strategies of corporations (Kandachar and Halme 2005), which is useful to modify any unintended negative impacts of corporations. As pointed by Walsh et al. (2005), evidence of success and failure both need to be documented. The growing number of academic critiques of this work and the recent disagreements over how – or even whether – BoP propositions can successfully be accomplished (Hopkins, 2005; Walsh et al 2005; Bendell, 2005; Jenkins, 2005; Jose, 2006; Crabtree, 2007; Karnani, 2007; Landrum 2007) confirms that much work remains to be done, especially in theoretical development and empirical analysis. This limitation is also found in the MPB approach; moreover, Craig Wilson and Peter Wilson have failed to show what exactly distinguishes their approach (MPB) in their examination of the successes, failures and missed opportunities of global companies.

3.2 Supporting public policy efforts

The challenges associated with sustainability and marketing with the poor require explicit policies and measures to improve international trade and intergenerational justice, local and national human rights and reduce poverty (Kirchgeorg and Winn 2006, Global Compact, 2000). The poor are highly vulnerable to international trade injustice and the majority of the poor live in countries with poor human rights records and/or limited capacity of their governments to address these issues (UNEP et al, 2005). In these cases the role of business in promoting and respecting trade norms and human rights is particularly important. Furthermore, the private sector can help development partners in their efforts to advocate for good public policy and public awareness, negotiate international rules and change market

frameworks. Therefore, the approach for sustainable business should be helpful in provoking key elements of policies for addressing international marketing equity and intergenerational justice. It should also be articulated to stimulate the provision of a springboard for a comprehensive programme of reform and change both at the local and international level. High transaction costs, lack of locally adapted property right regimes, etc. are barriers for business activities in developing countries, both regarding local entrepreneurs and international corporations (Soto, 2000), thus limiting the participating of the poor in markets.

Fair trade's core objective is finding an equitable means of trading by forming partnerships based on dialogue, transparency and respect that seeks greater equity in international trade and better trading conditions (Trends in Fair Trade 2003) as a result it has strong potential to influence and promote standards for international labour, environmentalism, and social policy. VCP, LRED and PSS have also a similar potential because they give priorities for government development policies, international norms and standards. In EE, environmentalism is kept at the fore front of the approach and can be a potent force to advocate policies, in particular related to environment. It can also be a bulwark for international environmental conventions. However, EE has greatly limited in capacity to influence any policy in its wholeness. MPB has strong critiques against corporate social responsibility, but its alternative is uncertain. Moreover, it has a strong product face and leading company perspective, in effect it has limitations in promoting local and international policies and justices. As Prahalad and Hart (2002) challenge corporations to be innovative and to find ways to avert social decay, and political chaos of the poor, the BoP protocol and SL seem to have a good potential to promote policies and social justice. However, increasing the political voice of marginalized groups that could help solve their major problems cannot be achieved simply by selling to the poor (Jenkins, 2005; Bendell, 2005; Karnani, 2006; Jose, 2006). To truly address poverty in the BoP market, there must be a multidimensional approach that goes further than simply encouraging absolute material consumption (Karnani, 2006; Crabtree). The strong product stewardship characteristic of both SSCM and sustainable design challenge the approaches' potential to serve as a systemic and holistic integrated approach for sustainability. The organizations involved in SE are smaller or less viable and as a result SE has capacity limitation to influence policy targets.

3.3 Focusing on the triple bottom line

In 1997, the Triple Bottom Line (TBL) emerged as a new tool for measuring organizational performance (Hubbard, 2006) and it aims to address the social, environmental and economic performance aspects. A sustainable business is in need of approaches, which can allow incorporation of TBL factors into their organisational structure and processes to address the three dimensions of sustainable development (Kuhndt et al, 2007). Therefore, an approach should be evaluated on the basis how much it delivers for the integrated achievement of a company for social, economic and environmental performance measures.

In this regard, SE has higher potential to provide practical solutions to economical, environmental and social problems at the local level (Hartigan, 2005). Fair trade has also a similar level of potential, because its underlying

assumption of promoting fair prices for all trade partners enables production that is socially just and environmentally sound. Sustainable design (D4S) has a similar potential level when it comes to focusing at the TBL. In theory, D4S insists that companies take all the three dimensions of sustainable development as a key element for their long-term product innovation strategy, but in reality companies currently emphasise only two dimensions of sustainability (environment and economy). The set of operators of the VCP system, which is a sequence of related business activities (functions) from the provision of specific inputs for a particular product up to the final sale of that product to the consumer, might enable it to administer and design the triple bottom line focus. However, VCP has limitation to function as a business approach for a particular corporation, as it does not provide the necessary procedures and information regarding the operation of a company at triple bottom line focus. This is also true for LRED. The social component of sustainability issues in EE is not explicitly addressed. EE has a medium level of potential to deliver for the integrated achievement of a company. This level of potential is also true for SSCM, SL, PSS, MPB and BoP protocol. As the BoP model is heavily based on economic driven suggestions and technical low-cost "sustainable solutions" (Hart, 2007), the other two dimensions might receive less attention in practice. The triple bottom line concept requires thinking beyond the economic imperative and companies are being challenged to seek a balance between three focus areas expanding beyond the traditional economic focus.

3.4 Empowerment of the poor and local value creation

The International Fund for Agricultural Development (1995) defined empowerment 'as the ability of people, in particular the least privileged, to: (a) have access to productive resources that enable them to increase their earnings and obtain the goods and services they need; and (b) participate in the development process and the decisions that affect them. Manfred Kirchgeorg and Monika Winn (2006) have included access to information as a third dimension of empowerment. Business, working in a spirit of 'enlightened self-interest', can empower the poor by facilitating their access to the market place, by finding new ways to address the needs of the poor and helping them into mainstream economic activity. In addition, the business sector can help the poor make their livelihoods more sustainable by creating opportunities for them to obtain the tools they need to be healthier, more secure, and more economically active. The products to be provided by the business sector should be locally needed, desirable, and affordable by the poor. Therefore, the market-based approach to empower the poor requires deep local insights.

Here, SE and Fair trade are the premiers. SE begins from what is achievable locally (Mair and Seelos, 2005) and its innovations focus on improving the lives of poor and marginalized groups. Fair trade aims at empowering marginalised producers and workers to become stakeholders in their own organizations and actively play a wider role in the global arena to achieve greater equity in international trade. The SLB approach is based on creating benefits both to disadvantaged communities and business companies. However, creating benefits to the poor could be successful if the poor have the opportunity to be empowered. This involves working closely with local authorities around issues that those groups deem important.

Though, noble experiments are being undertaken in the "BoP Protocol Project" to make sure how corporations can listen to the locals, the results are yet to come and for now the BoP protocol has similar problems as the SLB. The underling objective of BoP is enabling MNCs to generate new business opportunities at the BoP and also lifting billions of people out of poverty and desperation (Prahalad 2004). Here, the basic question is: who is going to determine the need of the poor? Landrum (2007) responding to this says, MNC will determine it by figuring it out the profitable way of providing the need for the poor. However, determining what best suits the poor requires "deep listening and mutual dialogue" (Landrum 2007). Ideally, entrepreneurs should be the unheard voices of the poor and promote development as defined by the poor. MPB is based on correcting the shape of the BoP proposition to make it a more pro-poor approach. It argues that to see the poor only as potential consumers misses half of the story (Wilsons, 2006). However, it is not apparent how mobilizing existing assets of marginalized groups to improve their lives is achieved. EE, SSCM, VCP, PSS and D4S have low profiles when it comes to empowerment of the poor with deep local insights. EE lacks the vision to mobilize the ideas, capacities, resources, and social arrangements required for long-term, sustainable, social transformations of the local poor people. SSCM and D4S have limited focus on the poor local constituent needs and capacities through empowerment approaches to poverty alleviation. The primary focus of VCP is to serve as an economic system for a set of enterprises. What should be checked is, however, how much it focuses explicitly on mobilizing existing assets of marginalized groups to improve their lives, rather than delivering outside resources and services. PSS is the outgrowth of the structural transformation in the service sector of the wealthy industrial economies; as a result it is short sighted in getting at board the poorest of the world, though it remains with huge potential.

3.5 Fostering partnership model

Creating values for the poor through the market involves inventive partnerships among companies, nongovernmental organizations (NGOs), development agencies, local and national governments. The motive of establishing partnership among the necessary stakeholders of the marketing process is not "doing good", but rather "defining common ground for doing the right thing", where the latter defines the common basis for cooperative endeavour (UNDP, 2006). The "win-win" business approach should establish the labelling ground for organizations to set up an 'honest broker' facility to help bring together the community, government, NGOs and other like-minded companies. Marketing with the poor requires building local movements and dealing with other powerful actors. Without the willing cooperation of local partners, any initiative would fail.

When it comes to establishing true partnership with government, the poor and other powerful actors, D4S and SSCM have both structural and visionary limitations. BoP protocol, MPB, EE, and SLB have vision and organizational capacity to establish a "win-win" partnership model. As Prahalad (2005) argues, collaboration between private, government, NGO, poor consumer is necessary for the BoP protocol, but MNCs should take the lead role in the BOP initiative (Prahalad and Hart, 2002). However, true partnerships should combine the best of all involved actors (UNDP 2006). In

addition, the BoP protocol, MPB, and SLB rely heavily on market mechanisms and in such situations governments could not be involved explicitly. The focus of the BoP protocol and SLB on the poor primarily seen as consumers, where the need of the poor is to be determined by the corporation, cannot represent the best interest of the poor. SE, Fair trade, VCP, LRED and PSS provide better space than other approaches for the establishment of the right partnership. As fair trade has a grounding commitment to the trading partners, it has the potent capacity to bring together the poor, resource providers and other allies for a better trading partnership. VCP has strong stance of maximizing efficiency of public promotion. It also serves as an intervention tool for shaping sectors as well as economies based on partnership models. Bringing together the relevant stakeholders of a particular sector of the economy is by far the major vision of the approach. According to the PSS concept industry, government and civil society need to work together to create and to facilitate the establishment and smooth functioning of such systems as part of a more sustainable economy.

3.6 Encouraging sustainable consumption patterns

As entrepreneurs and corporations have their origin in the West, by designing products and services for the base-of-the-pyramid markets, they practice their power of shaping consumer preferences and demands. Businesses have an important role to play in providing all material basis of society such as the infrastructure, technology, products and services that enable or constrain consumer choice; and all the non-material values and norms, institutions and cultures that govern a society in an informal way. They might play an important role in creating markets for sustainable products and services through direct advertising, education and eco-labelling. The role businesses can play in setting lifestyle trends and constructing the physical environment gets even more serious in developing countries, where these constructs are being newly established.

In order to achieve sustainable development in the base-of-the-pyramid markets, sustainable business approaches should ultimately avoid exporting Western lifestyles of consumerism. Instead, they need to put emphasis on satisfying basic needs while protecting the natural environment and utilizing the locally available know-how to the most possible extend. A ‘win-win’ business approach would have a business case and promote sustainable consumption among its target group. Most of the business approaches still need to reflect on what types of consumption patterns are encouraged through their products and services. Also, they can take a more proactive stance in supporting sustainable lifestyles (UNEP and UNDESA 2007).

In conclusion, sustainable business approaches targeting low-income markets have their own place in the current debate on the role of business in society. The analysis of these business approaches has achieved mixed results. Some have aimed at addressing flaws in framework conditions and others have intervened to deliver products and services directly, and "get

things done". Some have clear principles for the business to develop its own core business strategies to align them with the opportunities at the BoP market countered by lack of clarity in some others. In the following section, we try to focus with our analysis by building upon the general arguments made so far. Our aim is to reach concrete conclusions in terms of gaps and further opportunities.

4 Innovations and lessons learned in addressing unfulfilled needs of the poor

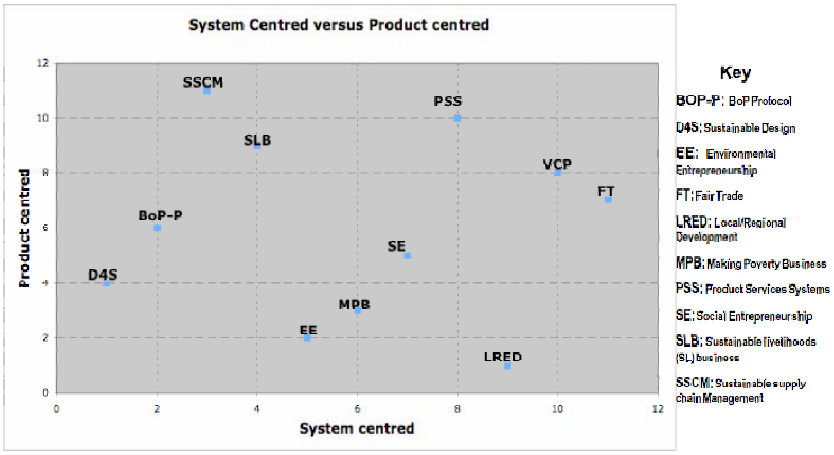
Initial evaluation illustrates only individual strengths and weakness of business approaches, while relative evaluation might better illustrate the gaps and opportunities for a novel approach. In the following, the eleven approaches evaluated in the previous section are positioned according to four characteristics. The characteristics are described in a way that they constitute a bandwidth with two poles between which the different approaches could be positioned. The characteristics were drawn basically from the criteria mentioned in the previous section The positioning was made on relative evaluation, hence, the graphs indicated in each characteristics were done based on relative ratings, which compare one business approach against another. All the eleven business approaches were considered for comparison. The lowest point, one point was given for the lowest ranked approach and the highest point, namely point eleven, was given for the approach ranked highest, relative to the others.

The characteristics used to position the sustainable business approaches were:

4.1 Focal point of the approach (Product centred versus system centred)

System centred here in this chapter refers those approaches which address local and international policies, conventions, standards, and international trade justice. This system centred pole measures the capacity of an approach to incorporate and transform the business impacts into decisions and actions that could serve to guide policy in a sustainable direction. It also measures its capacity to influence policy targets, its direction to serve as a bulwark for local and international conventions and justice. In contrast, the product centred approach refers to approaches that focus on selling products, with both the up stream and the down stream responsibilities. Very often product centred approaches go along with high management capacity and an emphasis on efficiency and financial returns along the value chain, as well as with product development and innovation.

Figure 2: Systems centred versus product centred approaches

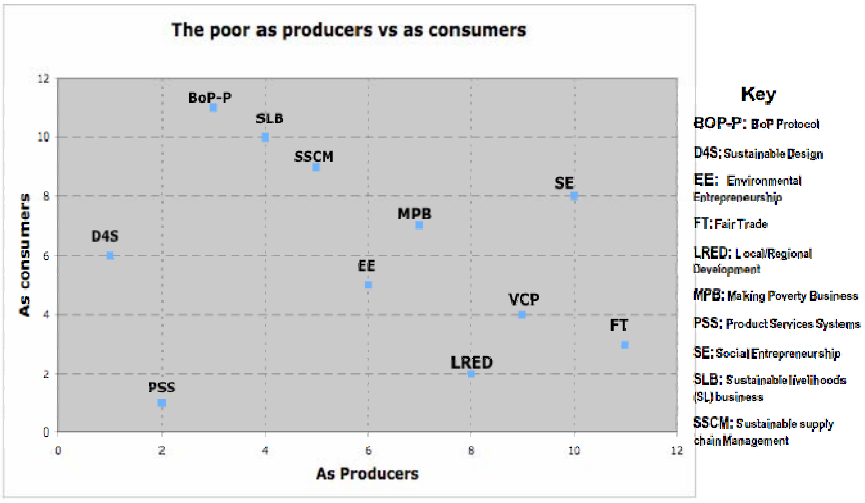


Conclusions based on Figure 2: Most approaches show a tendency to be either product-centred or system-centred. Sustainability at the BoP can be pushed forward through joining forces between product-centred actors and system centred approaches.

4.2 Role of the target groups (as producers versus as consumers)

This characteristic is located within the current debate of focusing on the poor primarily as either producers or as consumers for poverty alleviation. This has been become a disputable issue in particular after Prahalad´s seminal work on BoP. Here, the basic question comes: “Is it useful to conceptually separate the role of the poor as consumers and producers in discussing solutions to poverty?” This is still open to more academic exercise as both ways have important effects on poverty alleviation efforts.

Figure 3: Approaches targeting low-income groups as producers versus consumers.

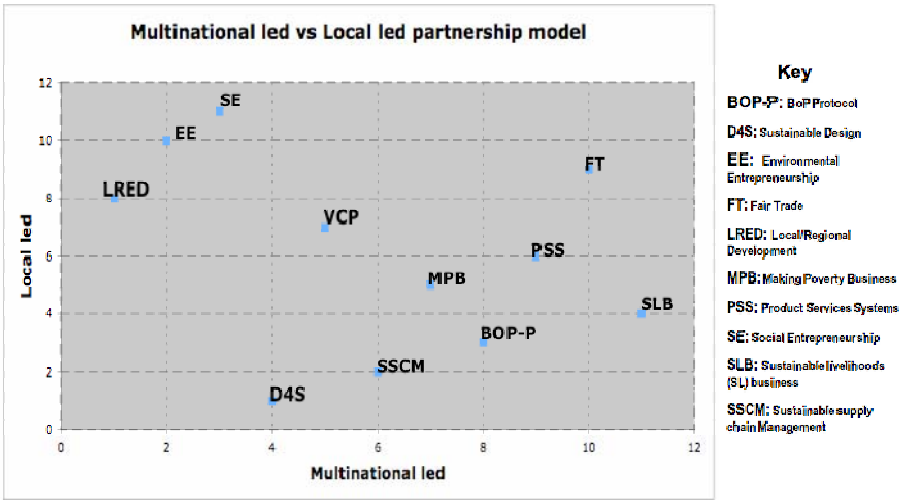


Conclusions based on Figure 3 are: Most approaches focus either on BoP members as producers or as consumers. There are hardly any approaches, which integrate BoP members as consumers and producers in a consistent way.

4.3 Partnership model (multinational actors led versus local actors led partnership)

Sustainable business approaches' partnership could have a better strength of partnership either with multinational or local actors. The advantage of stronger partnership with multinationals is that these often hold a broader financial basis as well as better management skills. The advantage of local partnership is the cultural and geographical knowledge with respect to the needs; potentials as well as conditions at the BoP that are crucial in order to effectively empower the poor.

Figure 4: Business approaches having multinational led versus local led partnership models



Conclusions based on Figure 4: Partnership approaches often offer a greater opportunity for empowerment and system change. The advantages of multinational and local approaches could be married via partnership approaches. However, in most of the business approaches the challenge remains how to partner as equals.

All in all, we are not arguing that all the challenges and opportunities of the sustainable business approaches are explained and shown sufficiently by the figures discussed above. There are other characteristics of the approaches that are not touched on by the figures and two major gaps, which are discussed below and observed almost in every approach are the cases in point. These gaps are the lack of monitoring and evaluation schemes, and encouragement of sustainable consumption and production. The following two paragraphs explain these two challenges of the business approaches in subject.

The sustainable business approaches targeting the BoP market should encourage the business to make judgments that incorporate long-term measures into the definition of their company success in their effort of making the market work for the poor in a sustainable manner. In any holistic process, performance measurement of social and environmental factors plays an important part while financial results tell only part of the story. Therefore,

the need for incorporating the principle of performance measurements into the characteristics of a business approach is essential, however, most of the approaches discussed before have failed to do so. Proper attention for performance evaluation and monitoring enables companies to look more widely and imaginatively at the fundamental purpose of providing continually improving goods and services to increasing numbers of customers at prices they can afford. It also enables them to improve their products in ways that serve societal ends, and increasing their customer numbers by reaching out to the large BoP markets.

The second limitation of the approaches discussed earlier is the lack of proper focus for encouraging sustainable consumption and production. Poverty eradication and social issues have clear linkages with the sustainable consumption and production agenda. Keeping this nexus and meeting the essential challenge of SCP, de-linking economic development from environmental degradation, require rethinking of current business models together with the challenge of how consumption problems (such as access, resource use and environmentally friendliness, inter-sectoral linkages) can be systematically addressed beyond technological solutions, and with political determination. The major sustainability focus of the business approaches discussed earlier is during the manufacturing and production phase of a product or a service. This is typically the characteristic of BOP, MPB, SLB, D4S, while fair trade, VCP and SSCM have some concern on the sustainability of a product's raw materials (natural resources). However, changing the existing ingrained patterns of consumption and production to become more sustainable also requires fundamental alterations to human behaviour as individuals and organisations. To this end, the business approaches are expected to find opportunities for the business in encouraging customers to act in a more sustainable way. Unfortunately, these have been almost overlooked almost in all approaches.

5 "Human Development through the Market" Approach

Building on the strength of the respective approaches presented above and bridging the remaining "gaps", the concept of "Human Development through the Market" seeks to provide an integrative vision how business can contribute to poverty reduction in a sustainable way. The concept was introduced and embraced during UNEP's 9th High-level Seminar on Sustainable Consumption and Production (SCP9) in Tanzania in December 2006 (CSCP, UNEP 2006), and has since then continuously been evaluated and refined.

The language of "Human Development through the Market" is new, but not the phenomenon – that is in the sense that practical business actions did exist in the past: despite the lack of the name "HDtM", the world has already had HDtM. Successful examples have shown how the concept can be put into practice and function in concrete situations. HDtM as a mindset is concerned with these concrete practical approaches to achieve tangible results, guiding different actors to start or join HDtM activities, or to support these through creating enabling framework conditions.

5.1 The pattern breaking idea of HDtM

Today's business responsibility has extended "beyond the fence" and marketing with the poor as a potential profitable business strategy is gaining more attention. Companies can become sustainable if they evolved from the compliance approach towards an accountability approach, and also if they made markets work for all, including the poor. A sustainable business approach should make companies accountable not only for the immediate impact of their practices, but also for the long-term evolution of their markets and thus the behaviour of consumers. Human Development through the Market (HDtM) as a sustainable business approach addresses these issues and benefits for both the poor and the companies.

'Human Development through the Market' (HDtM) is an approach that covers market-based environmentally and socially responsible activities that empower the poor to meet their basic needs. The HDtM approach includes the activities of business, entrepreneurs, NGOs, community based organisations and the public sector. It believes that public/private partnerships play an important role in empowering the poor to participate in sustainability improvements.

The activities that can be considered HDtM are manifold, but five key principles define the concept. Brief examples as described in CSCP and UNEP (2006) are referenced below to illustrate the principle in question.

5.1.1 HDtM is especially concerned about social and environmental value creation.

Regarding the environmental dimension, this comprises minimisation of environmental impacts, using fewer resources, and preserving ecosystems and other forms of natural capital. Regarding the social dimension, HDtM seeks to advance issues such as community integration, gender equality, and education. Overall, the change envisioned shall be sustainable and long-term oriented to preserve and enhance options for future development.

5.1.2 HDtM activities function collectively through the market.

They basically rely on market mechanisms to mobilise the resources necessary to implement innovative HDtM business models that aim to be financially self-sustaining in the medium to long term. Still, external funding can be used to start or expand the activities. HDtM often happens through new decentralised organisations, networks, and partnerships. Besides businesses, these might include NGOs, community based organisations and public bodies that contribute according to their respective strength to enable successful implementation of HDtM activities.

5.1.3 HDtM activities focus on empowering the poor and creating local value.

It creates development opportunities for people living in poor communities on different dimensions. These may include raising incomes of the poor, enabling access to new markets, satisfying basic needs, fostering assets and skills necessary for the poor to live reasonably secure lives, to cope with and recover from stress and shocks, and to preserve these opportunities for future generations. HDtM seeks to empower the poor as producers and consumers, helping them to develop products and services to

foster local development, and make these products widely available through new models of provision.

5.1.4 HDtM businesses perform monitoring and evaluation in close collaboration with key stakeholders

Monitoring and evaluation ensures that HDtM business activities contribute to human and environmental development through their market operation. It aims to determine the relevance, efficiency, effectiveness, impact and sustainability of the business model. Monitoring and evaluation enables the business to look at both market processes and changes in conditions of the target group, the poor, brought about by its marketing activities. It also identifies strengths and weaknesses in the business model. The performance information generated from monitoring and evaluation enhances corporate learning and contributes to the body of knowledge on what works and what does not work, and why (see the section on learning-based management heuristics below).

5.1.5 HDtM uses life cycle thinking to integrate consumption and production perspectives

Life cycle thinking integrates consumption and production perspectives, preventing a piece-meal approach (UNEP and SETAC, 2004). Life cycle approaches avoid problem shifting from one life cycle stage to another, from one geographic area to another and from one environmental medium to another. Thinking in terms of the life cycle of a product/service, HDtM recognise that each choice sets the stage for not only how the product/service will look and function, but also for how it will impact the environment and the community, as it is manufactured, used, disposed, or re-used and recycled. Through life cycle thinking, HDtM can provide for the business a means to assess process improvements in terms of their contribution to sustainable consumption and adds value by strengthening the supplier-customer relationship resulting in product differentiation and premiums. It helps the business to use its limited financial and natural resources more effectively.

5.2 Towards an effective, learning-based management heuristics for HDtM

HDtM does not only feature the five principles described above, but also aims to provide management heuristics to translate this vision into concrete action and projects. To support entrepreneurs in their continuous ‘bricolage’ process of developing, implementing and refining working business models (Mair and Marti 2008), CSCP and UNEP (2006) already provides a set of guiding questions that can be applied to carve out the HDtM characteristics of an evolving business model, as well as further tools and organisations that can be involved in setting up and running an HDtM business.

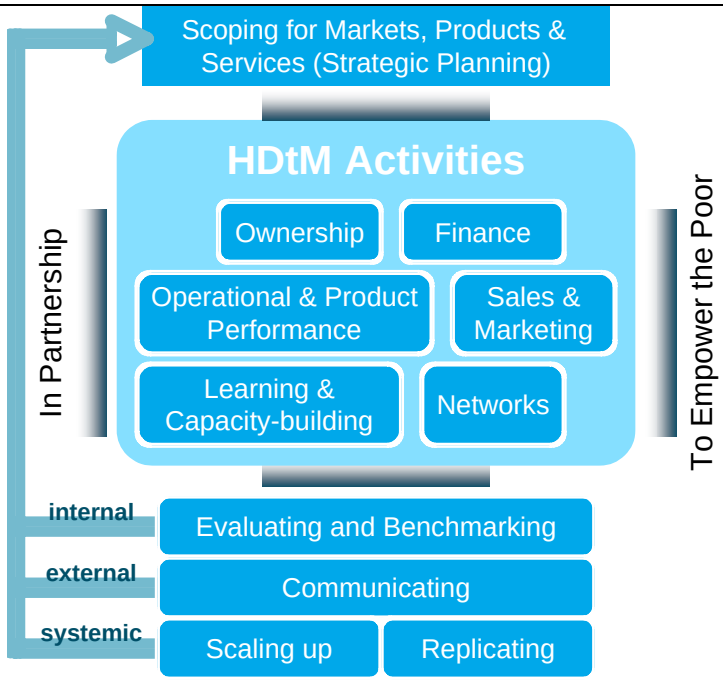


Figure 1: A management heuristic for HDtM activities

Based on a model presented by CSCP and UNEP (2006), Figure 5 provides a refined model for a management heuristic that recognises the importance of learning and capacity-building for HDtM on two key levels:

As an integral part of many HDtM activities (see inner box), the individuals and organisations involved learn how to optimise their behaviour to reach a given set of goals as identified in the scoping process. These learning processes range from technical and vocation training of staff, up to changes in the configuration in which organisations involved employ and combine their resources on a strategic level. This level corresponds to classic "single-loop" learning (Argyris and Schön 1978). A proto-type example for this kind of learning includes the development of a technological process of treating e-waste by Desco in South Africa (CSCP and UNEP 2006, p. 30), but similar examples can be found among most HDtM activities.

Building on the HDtM principle of 'monitoring and evaluation in close collaboration with key stakeholders', a second kind of learning takes place. Due to their sometimes volatile environment and the many trade-offs faced with when considering their "triple-bottom-line" impacts, HDtM activities will constantly be evaluated to rethink the scoping process that led to the initial formulation of markets, products and services. This 'double-loop' learning can happen through three ways:

- Internally, i.e. within the network of partners implementing the HDtM activities after evaluating and benchmarking their impact.
- Externally, i.e. through feedback from third partners on the HDtM activities. Many HDtM activities involve NGOs for independent monitoring of social and environmental impacts, as in the case of Sambazon, where NGOs ensure that fair trade premiums and human

rights are secured in the company's operations (UNEP and CSCP 2006, p. 23).

- From systemic learning occurring when trying to scale-up or replicate the activities. The Bangladesh NGO Waste Concern started treating organic waste and selling the product to home gardeners and small organic farmers. As slow growth of demand hindered a scaling-up of their activities, the NGO 're-scoped' their business by aligning with Map Agro, the largest fertiliser company in Bangladesh' (Seelos and Mair 2007). By doing that they assured a market for their product that would have been out of their reach in the original activity scope.

The management heuristic described above is currently tested in a pilot case for implementing a HDtM model based on sun-oven bakeries in Cameroon, and will be further developed for a planned social entrepreneurship training programme.

Over all conclusion

Sustainable consumption and production (SCP) is an area in which innovation and leadership is possible for both sustainability and poverty alleviation agendas. It looks beyond the product itself, and involves thinking on what type of lifestyles are encouraged. To make these characteristics of SCP reality, significant changes to prevailing business models are needed. In this respect, the Human Development through the Market (HDtM) approach is an essential heuristic to detail what these new sustainable business models might look like. The HDtM targets inspiring businesses to find new market opportunities by developing and offering products and services that address the needs of the poor through both environmental and social performance improvements. It has distinctive position vis-à-vis other sustainable business approaches. This position was demonstrated by the analysis of eleven different business approaches: Social Entrepreneurship, Environmental Entrepreneurship, Value chain promotion, Local/Regional Economic Development, BoP Protocol, Make Poverty Business, Sustainable livelihoods business, Fair trade, Sustainable supply chain Management, Sustainable Design, and Product Services Systems. The analyses of these business approaches have shown their different scope and depth. Some have aimed at addressing flaws in framework conditions and others intervened to deliver products and services directly, and "get things done". Some have clear principles for the business to develop its own core business strategies to align them with the opportunities at the BOP market, countered by lack of clarity in some others. However, common to all approaches, two characteristics are not covered: these gaps are the lack of monitoring and evaluation schemes and encouragement of sustainable consumption and production. Sustainable business approaches targeting the poor should encourage business to make judgments that incorporate long-term measures into the definition of their company's success in their effort of making the market work for the poor in a sustainable manner. In any holistic process of performance measurement, social and environmental factors play a part while financial results only tell part of the story. Therefore, the need for incorporating the principle of performance measurements into the characteristics of a business approach is essential; however, most of the approaches discussed above fail to do so. Changing the existing ingrained

patterns of consumption and production to become more sustainable also requires fundamental alterations to human behaviour as individuals and organisations. To this end, the analyzed business approaches are expected to find opportunities for businesses in encouraging customers to act in a more sustainable way.

The target of HDtM is to create social, environmental and economical value through the market. It is a "Win-Win-Win" business approach. It delivers an integrated achievement for companies through marketing with the poor. It also helps the poor to make their livelihoods more sustainable by creating opportunities for them to obtain the tools they need to be healthier, more secure, and more economically active. It informs the business sector to take action to reorient consumer choices towards more sustainable lifestyles and provides them with enabling procedures to make marketing strategies efficient when it comes to promoting sustainable consumption. HDtM pays proper attention to performance evaluation and monitoring, which enables companies to look more widely and imaginatively at the fundamental purpose of providing continually improving goods and services to the poor at prices they can afford.

The descriptions and the empirical analysis of HDtM as a business approach do not at all claim to be exhausting. We rather consider these a starting point and they invite other scholars to develop it further and extend the empirical analysis. We believe that at least the following open questions need immediate works.

- The primary organizational principle of HDtM is linking, bringing people together in mutually beneficial relationships and figuring out how individual responsibilities and contributions blend to produce extraordinary creative results. To make this happen, what kind of partnership model HDtM should have?
- Businesses can translate SCP strategies effectively into action when there is better business environment: good public policy and public awareness, negotiable international rules and enabling market frameworks. How public frameworks should be articulated to stimulate the provision of a springboard for a comprehensive programme of reform and change the business environment both at the local and international levels?
- HDtM aims to provide management heuristics to translate its vision into concrete action and projects. However, to benefit businesses while helping the poor the rules are different for different businesses: new resources and capabilities would need to be put in place, existing value chains must be redesigned, cooperative strategies have to be realigned and as well marketing management requires adaptation. How HDtM put in place the management heuristics in different situation?

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Chapter 2 Overcoming Barriers to Cleaner Production

examples from Chinese and Mexican industry

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1 Introduction

It is increasingly being recognized that many low hanging fruits are available for companies to green their operations while reducing their costs of production or increasing revenues. The reasons why these opportunities are not being exploited are many and vary across firms within the same sector and across sectors. The opportunities can be discovered because of changes (a) in regulation, (b) in management and engineers incentives and rewards system, (c) leadership and message coming from upper management, (d) in competitive pressure, and (e) in pressure from environmental and civil society groups (Ervin and Carpentier, 2002). In other cases, the fruits may be ripe but not low hanging and require coordinated efforts to affect changes. Two examples are presented below that illustrate the coordinated set of actions that are needed to initiate a process to make the production process along the supply chain both lean and clean. The two experiences are analyzed to identify common drivers.

One of the authors participated in the implementation of the UNDP/GEF project "Barrier Removal for the Widespread Commercialization of Energy-Efficient CFC-Free Refrigerators in China". The project succeeded in bringing about a significant and ongoing reduction in the amount of electricity used annually by household refrigerators in China and corresponding reduction in greenhouse gases. The other author was head of the Environment, Economy and Trade Division of the NAFTA Commission for Environmental Cooperation for 7 years. As such she was in charge of the NAFTA CEC mandate to monitor the environmental impacts of NAFTA trade liberalization. These impacts were documented and discussed at biennial NAFTA Symposium on Trade and Environment where North American experts from all sectors of society were invited to use the CEC multidisciplinary analytical assessment framework to conduct their analysis. Lessons from these papers are presented.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

2 Energy efficiency in the Chinese refrigerator market

2.1 Barriers to cleaner production

From 1990 to the present, the refrigerator industry in China has undergone significant consolidation, with the number of producers falling from over 100 to around 25. Twelve Chinese firms now alone account for over 90% of production and sales. The concentration of production among only a few domestic producers means that their designs will influence the future energy consumption of a large share of China's refrigerator stock. At the outset of the project, however, even the top domestic manufacturers had not explored or implemented technology improvements owing to the existence of numerous barriers. These barriers were expected to persist and unless addressed by the project would effectively prohibit a commercial market from developing in China. The key barriers were: .

a. Lack of awareness of the lifecycle economic benefits of high-efficiency refrigerators. Consumers remained highly sensitive to the first-costs of their purchases and prefered models with low purchase prices and higher electricity costs because they did not fully appreciate that total lifecycle costs can be much lower for high-efficiency models.
b. Lack of reliable, comparative information available to consumers about specific models. Even if consumers wanted to purchase models with low lifecycle costs, they were unable to make comparisons between models because labels did not exist which provided such information in a consistent and easy-to-understand manner. Existing labels that did appear on some models lacked national certification based on national energy-efficiency criteria and provided inadequate information. This led to consumer confusion and growing government concern over proliferation of multiple criteria.
c. Manufacturer uncertainty about market demand for high-efficiency models. Manufacturers have had access to few, if any, market research studies about the potential demand for high-efficiency models in the Chinese market. Only recently, with rising electricity prices, more disposable income among a growing segment of Chinese society, and a greater emphasis on competitiveness in industry, had consumer attention turned to high-efficiency products.
d. Manufacturer uncertainty about cost-effectiveness of high-efficiency models. Manufacturers were uncertain about both the costs of developing and producing high-efficiency models, and the price premium that high-efficiency models might command. Therefore, manufacturers were reluctant to commit the resources to develop and produce high-efficiency models. .
e. Lack of expertise in energy-efficient refrigerator design. The majority of Chinese manufacturers lacked the engineering and design expertise to develop new energy-efficient refrigerator models or improve the efficiency of existing models for three reasons. First, manufacturers had not cultivated the skill sets necessary for energy efficient refrigerator design. Second, most domestic manufacturers had relied heavily on imported or licensed technology and therefore were reluctant or unable to develop new energy efficient product designs. Finally,

many domestic manufacturers have in the past relied on a limited and unchanging product line for their sales, and therefore had extremely limited experience in product design and redesign. For these reasons, many manufacturers were uncertain of their ability to move in new technology directions without targeted training to impart the necessary skill sets.

f. Higher-efficiency compressors were not available domestically. In order for a Chinese refrigerator manufacturer to design and produce a high-efficiency model, a higher-efficiency compressor must be utilized. Prior to the project such compressors were not available domestically; the higher cost of imported high-efficiency compressors was a strong disincentive for domestic refrigerator manufacturers to utilize them.

g. Dealer reluctance to stock or promote high-efficiency models. Uncertainty about consumer demand; the need to educate their sales force; and fear of reduced sales due to higher prices all made dealers reluctant to stock high-efficiency models. Survey results had also indicated that sales staff were uneducated on the benefits of energy efficiency and unable to provide consumers with reliable information.

h. Lack of an appliance recycling program. The lack of an appliance recycling program means that often unnecessary refrigeration was occurring. As China's refrigerator market was maturing, an increasing proportion of purchases involved the replacement of an old refrigerator. Unlike most developed countries, where older appliances are scrapped or recycled, market research indicates that 50% of new buyers in China keep their old refrigerators. The older refrigerators still in use may offset much of the efficiency gains from the purchase of new refrigerators.

i. Lax efficiency standards. Experience in countries adopting mandatory efficiency standards has proven them effective in removing the most inefficient models from the market and in creating expectations of periodic increases in minimum energy performance standards. Prior to the project, China's efficiency standards, promulgated in the 1980s, were established in view of the needs of hundreds of small refrigerator producers. They were outdated and provided no incentives for companies to increase the energy efficiency of their models. (USEPA, 1997)

CFC conversion activities for refrigerators in China were not addressing these barriers. The Montreal Protocol Fund (MPF) was supporting the conversion of refrigerator and compressor factories to hydrocarbons and HFCs, but the MPF did not support the funding of energy efficiency measures beyond measures necessary to maintain the unit energy consumption in the face of CFC conversion. Since combining energy efficiency redesign and retooling with CFC conversion offers opportunities for implementing energy efficiency measures at lower cost than would otherwise be the case, it was important to take advantage of these planned changeovers to introduce new energy-efficient designs and technologies. No proposed or approved Montreal Protocol projects had included or been complemented by energy efficiency components.

2.2 Cleaner production and consumption strategy

The project was designed to incorporate two major elements, each of which involved several different sub-components. The project combined elements of:

- "Technology push"—providing a combination of training and technical resources, energy performance standards, plus financial incentives, to induce refrigerator and refrigeration compressor manufacturers to increase the efficiency of the household refrigerators they produce; and
- "Market pull"—raising awareness and educating consumers in the market through a combination of appliance labeling, retailer education and an extensive media campaign, to create acceptance and to encourage the purchase in quantity of energy-efficient refrigerators in the market.

"Technology push" activities involved in the Project included:

1. In-country technical assistance and overseas training for engineers from manufacturers of refrigerators and refrigerator compressors.
2. Compressor manufacturer incentive competitions with monetary awards.
3. Refrigerator manufacturer incentive competitions with monetary awards.
4. Revision of refrigerator energy efficiency standards to make them 20% more stringent.

Recognizing that effective commerce requires both buyers and sellers of goods to be ready to participate at the same time, the Project was designed to address the problem of refrigerator efficiency not only through spurring the development and manufacturing of energy-efficient refrigerators, but also by assuring a market for such units. The "market pull" activities included in the Project, and their relationship to each other, are summarized below.

1. Education of appliance retailers and establishment of a retailer incentive program with monetary awards.
2. Development of the first energy efficiency information label in China, with refrigerators as its first application.
3. Consumer education (media) campaign and related activities employing TV, radio, and print media pieces, including articles, advertisements, documentaries, posters, and other activities to raise consumers' awareness of the environmental and economic benefits of energy-efficient refrigerators.
4. Mass purchase of energy-efficient appliances by Government agencies.

2.3 Impact of measures employed

The project resulted in an increase of nearly 29 percent in the weighted-average efficiency of household refrigerators produced in China between 1999 and 2005, as well as impressive improvements in refrigeration compressor efficiency. It is likely that the improvements produced by the project will continue to accrue for years to come. Compressor manufacturers involved in the project exceeded virtually all of their

production and improvement goals, and refrigerator manufacturers, with one exception relating to a corporate financial legal situation, did likewise.

The project resulted in the savings of about 11 million tonnes of CO_2 emissions by 2005, and will result in a total of 42 million tonnes of CO_2 emission savings by 2010. Counting the entire savings over the lifetimes of the refrigerators affected by the project, it is estimated that a total of about 170 million tonnes of CO_2 for refrigerators produced through 2005 (savings occurring through 2020) and a total of about 630 million tonnes of CO_2 for refrigerators produced through 2010 (savings occurring through 2025) will be achieved. (United Nations, 2006)

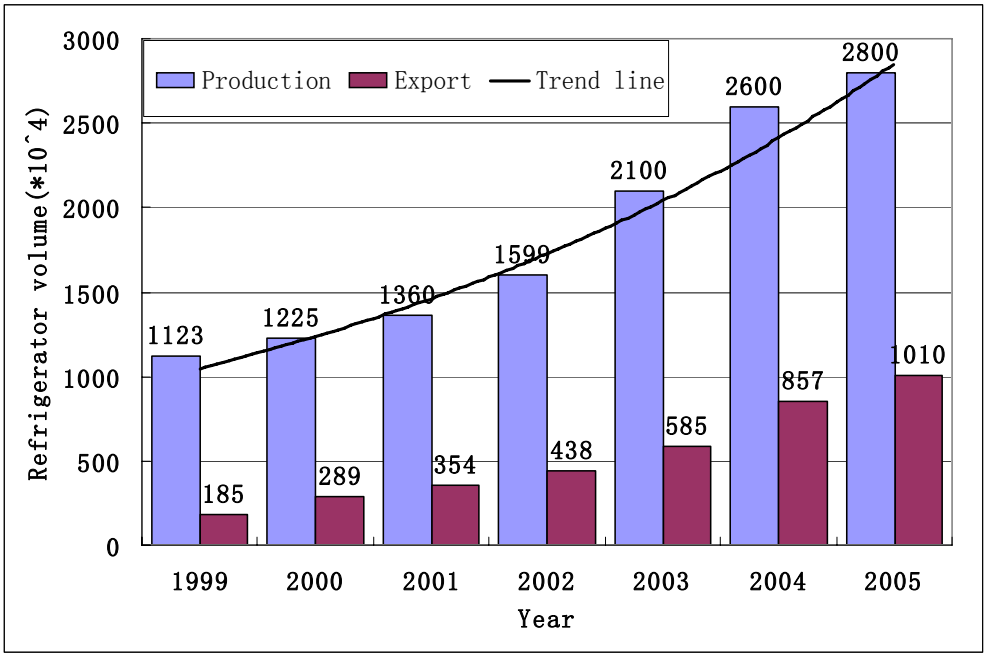

Figure 1: China's refrigerator production and exports, 1999 through 2005 (Jiang, 2006)

Substantial leveraging of donor funds was achieved, and appears to have been substantially exceeded, largely through the enthusiastic response of the manufacturers (compressor and refrigerator) involved in the Project. Figure 1 below shows the project-related investments made by just one participant—Dongbei Huangshi Compressor Company. Here the facilities, research, and market development investments made by the Company in its line of high-efficiency compressors exceeded the value of the incentive won by the company by a ratio of nearly 20 to one. Several machines used in the production of high-efficiency compressors by Dongbei Huangshi were purchased at least partly using the proceeds of the UNDP/GEF award to the company. Similarly, investment by the refrigerator manufacturer, Kelon, in developing energy-efficient refrigeration products exceeded by more than 50-fold the value of the total awards won by the company. Spending on advertising of energy efficient appliances by Kelon alone dwarfed the direct public relations spending by the Project, further indicating the Project's use of leverage in its information campaign. The Haier Corporation reported

increases in annual investments related to energy-efficient refrigerators between 2000 and 2006 of about three-fold for human resources investments, eight- fold for development funding, 20-fold for market exploration, and 7-fold for mould-making expenses. (Haier, 2006)

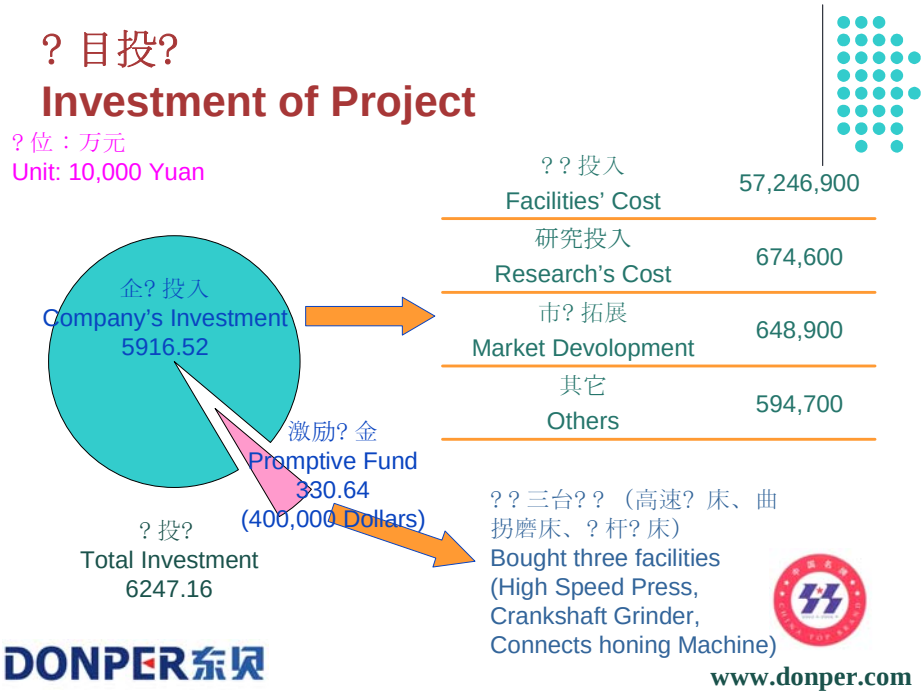

Figure 2: Example of leveraging of project funds: Investment in energy-efficient compressor development, marketing, and production facilities by Dongbei Huangshi relative to Project funds received (Dongbei, 2006)

Project funds spent on public awareness efforts have been highly leveraged in both magnitude and in duration by the marketing funds spent on energy-efficient refrigerators (and components) by project participants. Kelon reports spending 80 percent of its advertising budget in recent years on advertising energy-efficient refrigerators. Another refrigerator manufacturer reports spending over 95 percent of its budget for advertising refrigerators during 2005-2006 on advertising energy-efficient models.

Project training funds were and continue to be substantially leveraged by ongoing and additional training by manufacturers. The manufacturers reported that their participation in the Project has encouraged them to press forward with more active and effective programs of training (including external training and bringing both national and international experts to the company). In addition, the staff trained during the Project have uniformly reported working to train co-workers, thus passing on the information and know-how that they received in their own training under the Project.

2.3.1 Changes in the Compressor Market

The compressor efficiency improvements achieved under the project exceeded expectations. Compressor efficiencies have continued to improve

as a result of the project, with the most efficient compressor currently produced by Dongbei Huangshi achieving a COP of 1.95, reportedly a world-leading value. Figure 3 shows the degree to which compressor models by Dongbei Huangshi met or exceeded the COP values bid by the company, and Figure 4 summarizes high-end improvements in compressor COPs by Dongbei Huangshi under the project.

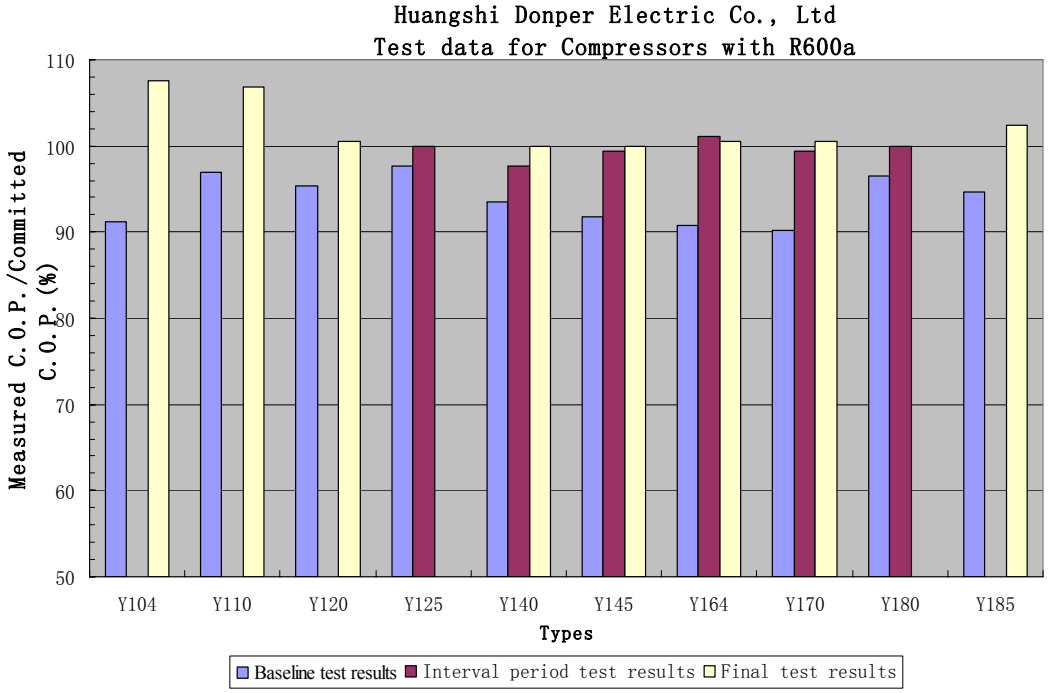

Figure 3: COPs of Compressors (Dongbei, 2006)

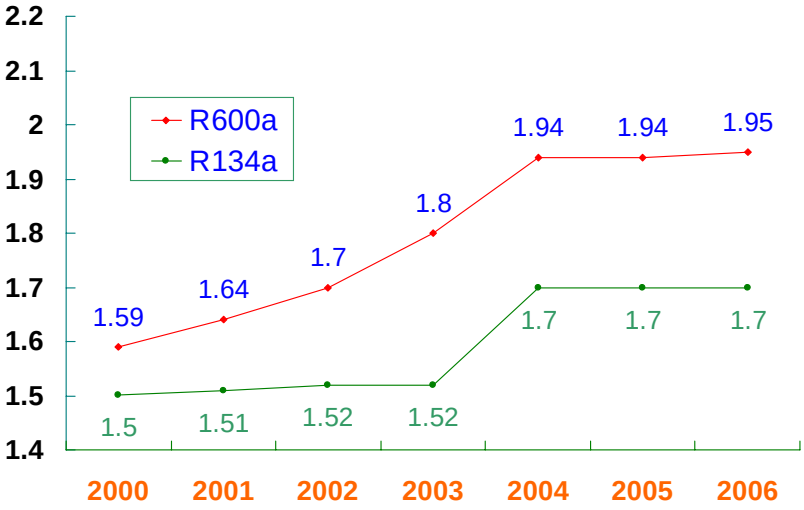

Figure 4: Evolution of COPs of highest-efficiency compressors produced. "R600a" denotes (CFC-free) units using isobutane as a refrigerant, while "R134a" denotes units using R-134a, a HFC compound. (Dongbei, 2006)

Sales of energy-efficient compressors, as implied by the COP figures above, have vastly exceeded target levels. Figure 5 shows the degree to which sales of such compressors have exceeded targets (except for in 2003, due in part to refrigerator makers not yet being ready with the design of refrigerators to accept high-efficiency compressors. Figure 6 shows that energy-efficient compressors have rapidly and steadily increased their share of Dongbei Huangshi's sales.

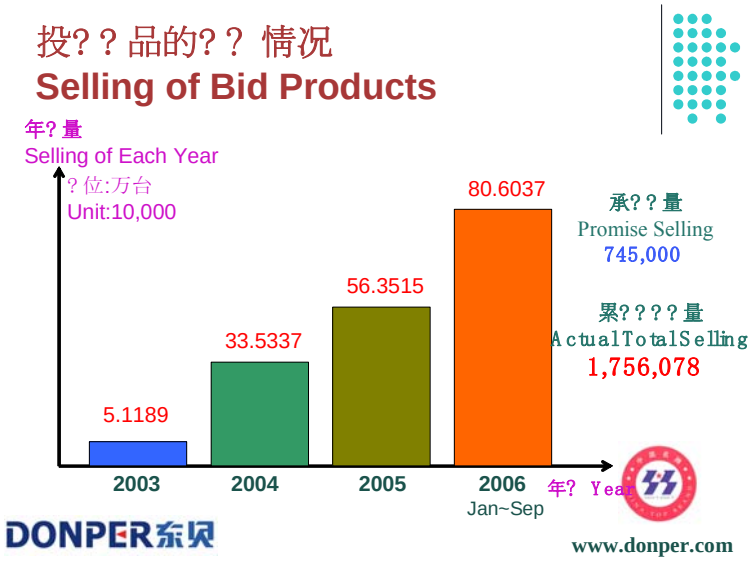

Figure 5: Actual sales of high-efficiency compressors versus bid target by the Dongbei Huangshi compressor factory (Dongbei, 2006)

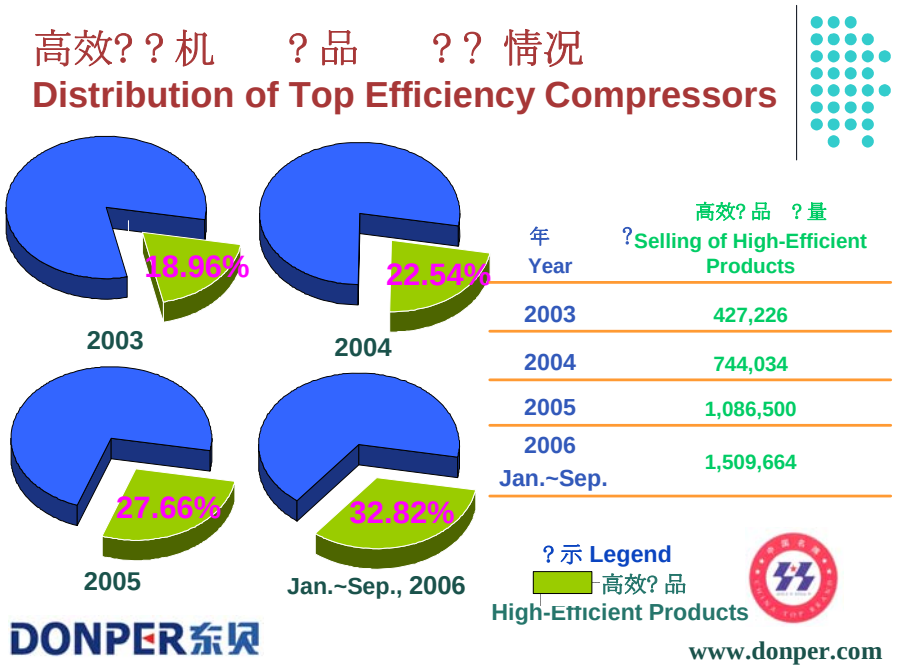

Figure 6: Sales of high-efficiency compressors as a fraction of total compressor sales by the Dongbei Huangshi compressor factory. (Dongbei, 2006)

2.3.2 Changes in the Refrigerator Market

Like compressor efficiency improvement, refrigerator efficiency improvement has exceeded expectations, with models from at least two manufacturers achieving energy coefficients of less than 0.3 (that is, using less than 30 percent of the energy of a similar-sized unit that just meets standards) available by in 2005. Some current models have energy coefficients as low as 0.21, which is a striking improvement from pre-Project conditions. More importantly, there has been a significant shift in the average efficiency of refrigerators produced and sold, as indicated in the tables shown below.

The top two performing manufacturers participating in the Project together exceeded targets and goals for both production of energy efficient refrigerator models, and for the energy efficiency of those models. For both Kelon and Haier, energy-efficient refrigerator/freezer models have become mainstream top-sellers, and are highly profitable products for the companies. Table 1 shows the sales by year by efficiency category for Haier. (Haier, 2006) Over the years Haier's production of energy efficient models has changed. In 2000 only 35 percent of refrigerators produced met the (current) standards for "Grade 1" units (energy intensity coefficient of 0.55 or less), but by 2006, 91 percent of Haier's production met Grade 1 standards.

Table 1. Production of refrigerators versus energy efficiency coefficient (Haier, 2006)

Energy-efficiency coefficient η（GB12021.2-2003）	Production Quantity (Unit)						
	2000	2001	2002	2003	2004	2005	2006 Jan.-Sep. 2006
1.0<η	130232	9175	36015	0	0	0	0
0.9<η=1.0	289025	261277	246382	30768	0	0	0
0.8<η=0.9	94915	122909	258545	228830	139645	0	0
0.7<η=0.8	494219	382267	340057	416312	209467	112401	33318
0.65<η=0.7	107228	38931	63331	95911	160591	149868	64638
0.6<η=0.65	115884	192514	479826	677631	768046	19558	199910
0.55<η=0.6	211461	176685	350075	758529	986980	824272	333184
0.5<η=0.55	377451	445425	724202	724568	1024612	1298942	1199463
0.4<η=0.5	360407	609664	235374	382652	2226625	3297090	3198568
0.3<η=0.4	26496	93548	44206	86348	907691	1139331	1034870
0.2<η=0.3	0	0	0	8967	558579	651925	599731
η Minimum	0.33	0.33	0.33	0.26	0.22	0.22	0.21
Total Sales	2207318	2332395	2778013	3410516	6982236	7493387	6663682
Sales η > .55	65%	51%	64%	65%	32%	15%	9%
Sales η = .55	35%	49%	36%	35%	68%	85%	91%

2.3.3 Standards and label development

Refrigerator, freezer, and air conditioner standards were successfully revised, paving the way for effective standards revisions in the future. Energy labels and the point-of-sale information materials that have accompanied label introduction, have been effective tools for communicating energy efficiency concepts to consumers, as well as being effectively used (and well-understood) by retailers. Figure 7 provides a sample of the labels (here, uncharacteristically, for a refrigerator not meeting the "grade 1" or "grade 2" criteria) that are used to help consumers to distinguish more-energy-efficient from less-energy-efficient appliances. The labelling system, and the appliance efficiency grading system on which it is based, is clear and understandable. Table 2 shows the correlation between energy efficiency coefficients and Grade levels for refrigerators and freezers, based on current standards and certification levels.

Figure 8: Example of energy information label for refrigerators in China

Table 2: Designations of grade levels for refrigerator energy label. Here η is the percentage of the energy consumption of a refrigerator of equivalent size just meeting standards.

Fraction of Maximum Electricity Consumption	
η≤ 55%	1
55%<η≤65%	2
65%<η≤80%	3
80%<η≤ 90%	4
90%<η≤ 100%	5

2.4 Conclusions regarding sustainability of gains

The manufacturing companies report deep and ongoing commitment to sustaining and enhancing the technology improvements spurred by the Project. This commitment is reflected in part by the ongoing training and R&D commitments described above, as well as the plans noted below for increasing production of high-efficiency appliance components by compressor manufacturers, and energy-efficient appliances by refrigerator manufacturers. The fact that efficient units apparently are also reportedly high-profit units further increases manufacturer's already strong incentives to continue to pursue energy-efficiency, as does Chinese producers

increasing presence in and goals for participation in the appliance export market.

2.4.1 Compressor manufacturers

Specifically, at the Dongbei Huangshi compressor facility, all of the staff trained both on-site and on study tours remain with the firm, though some are now in supervisory positions in part due to the experience and expertise gained as being involved in Project training activities. Although Dongbei Huangshi had a relatively active program of staff training prior to the Project, Dongbei Huangshi officials reported that as a result of the project their own training procedures—including sending staff to special research institutes and inviting foreign and domestic experts in the compressor and refrigeration sector to visit Dongbei Huangshi—have become more effective due to the contacts with technical experts gained during the Project.

Similarly, Dongbei Huangshi also reported that participation in the Project has significantly improved their Research and Development R&D process, both through the tools and training provided by the Project, through better access to national and international experts in refrigeration technology acquired as a result of the Project, and through changes in the organization of their R&D effort made in order to take advantage of Project training offerings. One change cited in particular by Dongbei Huangshi officials was that the theoretical background in compressor mechanics and thermodynamics provided to the company's engineers through the Project training activities has allowed the R&D staff to design compressors to be more efficient from a theoretical standpoint, rather than simply testing new compressor options empirically. This ability has dramatically increased the speed of compressor technology innovation at the company.

Dongbei Compressor Company reports a plan to increase the proportion of its compressors that are energy efficient models to 45 percent in 2007, up from just under a third in the first three quarters of 2006, and from 19 percent in 2003 (see Figure 6). In the process, Dongbei will phase out some of its less-efficient compressor product lines. Dongbei also plans to expand its line of energy-efficient compressors to the 3 hp size (from the roughly 1/10 to 1/5 hp sizes used in the most common sizes of household refrigerators). While Dongbei has no fixed timetable for expanding its line of energy-efficient compressors—the timetable will depend on the development of demand for the compressors in the refrigeration industry—when produced the larger energy-efficient compressors will extend the energy-saving impacts of the Project into the large household and commercial refrigeration product lines.

2.4.2 Refrigerator manufacturers

Like Dongbei Huangshi, each of the Refrigerator manufacturers visited appear to be very much on course to continue the trends in improvement in development and production (and thus sales) of refrigerators of increasingly higher efficiency. Both Kelon and Haier report significant improvements in their research and development programs, as well as internal and external staff training (see above) that seem likely to prevail, in no small part because energy-efficient models have become mainstream top-sellers for the companies, and are highly profitable. Management at both

companies seem committed to continuing efficiency improvements through development of human resources, as noted above.

Refrigerator manufacturers are also highly likely, given the patterns of efficiency improvement noted previously, to continue to improve their models. The availability of improved compressors will help, but these companies are also driven by competitive pressures that will keep them working to achieve higher efficiency in their products. The competitive pressures exits among the Chinese refrigerator manufacturers, with other companies in China, and with companies from outside China in the global marketplace. As the segment of the Chinese market that wants larger refrigerators grows, and as Chinese producers seek to produce refrigerators appropriate for other markets (such as refrigerators for the North American markets, which are 2 to 3 times the volume of average Chinese units), efficiency innovations are and should continue to spread to a wider range of products.

Both Kelon and Haier produce considerable amounts of commercial refrigerators and freezers. The imperative for efficiency improvement in these units—some of which are quite small—has not yet been as high as for the (admittedly larger) residential market. Some innovations from the residential market will undoubtedly carry over to the commercial markets, but initial efforts in this area may be helpful. We will show in the next section that this is especially so if these firms intend to export to developed countries with higher environment management standards.

3 Environmental market pull and regulation push in Mexico under NAFTA

The creation of the Commission on Environmental Coordination (CEC) un the North American Free Trade Agreement (NAFTA) in 1994 resulted from fears later transformed into hypotheses in the CEC Framework for Environmental Assessment including:

1. NAFTA will lead to a regulatory/migratory “race-to-the bottom”;
2. NAFTA will create competitive pressures for capital and technological modernization or create pollution havens;
3. NAFTA will lead to upward convergence of environmental practice through activities of the private sector or the government;
4. NAFTA will reinforce existing patterns of comparative advantage and specialization to the benefit of efficiency;
5. Liberalized trade rules under NAFTA will serve to increase the use of environmentally preferable products.

After 14 years and more than 50 papers studying and documenting these effects, the CEC’s work shows that liberalized trading rules under NAFTA did not generally lead to pollution haven and race to the bottom. However, it also did not generally lead to environmentally-preferable outcomes. Trade liberalization is a tool that, if well used and monitored, can lead to environmental and social improvement — institutions and policies can and do affect environmental outcomes. The main conclusion is that good policy makes the difference (Vaughan and Block, 2002; Panitchpakdi, 2002).

On the whole, the environmental effects of trade liberalization may be a path-dependent process whose ultimate outcomes depend on the choices initially made and the policies subsequently pursued. With this conclusion in mind this section explores what policies and market forces seem to have had positive impacts on NAFTA environmental regulation and performance.

3.1 Mexican industry in general

Using data from 221 Mexican manufacturing sites, Wisner and Epstein (2005) found that both the "push" effect of regulatory influence and the "pull" effect of market pressures affected industrial environmental management and performance. They found that the "pull" market effects were significantly more influential than the "push" regulatory effects. These hypotheses come from the fact that NAFTA brought in Mexico, an emerging economy, into a trade agreement with two developed nations. As a consequence of NAFTA participation and pressure from US and Canadian civil society, environmental management became more important in Mexico. Oversight agencies were created, laws were passed, and enforcement procedures were strengthened and over time transparency and public participation increased. NAFTA also deepened the North American economy integration. Final consumers and supply chain partners in the U.S. and Canada compelled Mexican manufacturers to satisfy their historically, legally, and culturally more demanding environmental management criteria. Wisner and Epstein, 2005; Domínguez-Villalobos and Brown-Grossman 2005; Barajas, Rodrigues, and Garcias 2005; Schatan and Castilleja, 2005; Studer, 2005), all find that Mexican facilities that export to U.S. and Canadian customers tend to be more environmentally responsive than those facilities only selling their products domestically. Christmann and Taylor (2001) found a similar effect on Chinese firms selling to customers from industrialized countries. For instance, these firms tended to have better environmental performance and to adopt international environmental management standards.

Domínguez-Villalobos and Brown-Grossman (2005) also conclude that new export market incentives along with new environmental regulations and a general behavior oriented more towards learning and innovation, resulted in new patterns of business that started taking their environmental impacts more seriously into account. The authors demonstrate a growth in investment in four sectors that are either energy- or water-intensive and subject to considerable federal regulatory pressure. Investment is still concentrated in very large firms and exporting firms (often the same) with insufficient investment in smaller firms.

The results of the econometric models show environmental investments positively associated with size, the pressure of foreign shareholders, businesses' technological capabilities, business performance, regulations and the need to comply with the standards required by customers in the international market. However, these market pull incentives were not sufficient to achieve widespread environmental investment. Investments were highly concentrated in very large companies in five sectors of the economy (basic metal

industry, metal products, machinery and equipment, food and beverages, and textile, garments and leather) as was previously found by ECLAC and the GTZ in Argentina, Chile, Colombia and Mexico. Given reduced enforcement budgets, environmental authorities have focused on larger, more notorious polluters. With little enforcement pressure and limited if any access to credit, micro and small business polluters do not feel the pressure nor have the means to improve their environmental performance.

Information and incentives – including accessible and subsidized loans -- to small businesses would be key to further improvements since monitoring these micro and small firms maybe inefficient. Small businesses still believe, wrongly to a large extent, that environmental stewardship is a cost only. Reducing the information costs for them to identify efficient solutions as was done in China for larger enterprises would be part of the solution. Technical centers (e.g. National Cleaner Production Centers) or efforts to green the supply chain that help them identify solutions to their specific problems and point to the benefits of cleaner technologies, in the form of lower waste, energy and material costs have been extremely successful (CEC, 2007). In Mexico, the CEC co-sponsored Pollution Prevention Fund (Fondo de Prevención de la Contaminación—FIPREV) has been very efficient but is still little known among the small businesses.

3.2 Mexican Maquiladora

Meixcan Maquiladoras - factories along the US-Mexican border that imports materials and equipment on a duty-free and tariff-free basis for assembly or manufacturing and then re-exports the assembled product, usually back to the originating country – are primarily involved in the electronic and automobile sector. A study of the environmental management of these Mexican firms by Barajas, Rodrigues, and Garcias (2005) found that instead of creating a pollution haven, NAFTA has favored the Mexican industries that are less pollution intensive due to the concurrent increase in environmental laws and enforcement. Barajas et al classified the maquiladora firms into 4 classes of production and technology refinement. Of the 293 firms studied, only 7 were intermediate-basic and 10 were advanced technologically (invested in R&D, develop prototypes, and product design). The reminder fell almost equally between basic (assembles and package intermediate goods and parts) and somewhat advanced technologically (manufactured final goods with mechanized production systems, manufactured tools, and equipments). They found that almost 25% intermediary firms applied environmental management criteria because they were pushed by headquarters to get an environmental certification such as ISO 9001, 9002, 14001 y 14002. Another 25% did so because of pressures from the environmental authorities. Less technologically advanced firms

invested less in environmental management and performance and did when pressured by the environmental authorities. Still, about half of the firms in each level of technological development made environmental investment on there own. Of the major constraints to improve environmental management and performances, firms indicated that the complexity and lack of coordination within the environmental and enforcement agencies was the most impeding. These administrative burdens came ahead of the need for fiscal incentives or capacity building programs. Yet, capacity building programs are important since more than half of the certified firms have or are participating in the voluntary audit program that include capacity building. The majority of environmental problems in these firms were related to the storage of toxic wastes, and treatment, shipment off site and export of industrial wastes. The majority of the low-level technology firms was domestically own, while the intermediate and advanced technology firms were US owned and Asian for the most advanced.

There is little, if any sign of convergence in technology among NAFTA countries and NAFTA did not speed up the rate of technology diffusion (Carpentier, 2006). Multinational corporations in the maquiladora program, with some exceptions, do not incorporate environmental technological improvements in all their plants and, if they do, the degree to which this is done is more in accordance with local requirements then a transfer of technology from headquarters (Schatan and Castilleja, 2005). The Mexican electronics and automobile sectors together form the majority of export activity and FDI flows in the Mexican economy. These sectors also have large forward and backward linkages into the economy creating a multiplier effect down and up the supply chain. The two sectors have in common that the deeper along the multinational corporation supply chains a firm is, the weaker are environmental management systems and environmental performance (Schatan and Castilleja, 2005, Studer, 2005). The market regulation or push effects were found to provide few incentives for sustainable production and consumption by both authors. The push effect was found to be stronger in the car parts and assembly sector driven by stricter auto emission standards and general performance upstream in the US (Studer, 2005). The US electronic market is less demanding environmentally then the European sector and was found to have little pull effect (Schatan and Castilleja, 2005).

3.3 Greening the supply chain

The CEC sought to develop a new, replicable mechanism for promoting pollution prevention in SMEs that supply large companies, as part of its work to promote cooperation in protecting and improving the environment, in the context of increasing economic and trade links in the North American region.

Bristol-Myers Squibb, Colgate– Palmolive, SIKA Mexicana, and JUMEX all based in Mexico had 65 of their Mexican suppliers participate in the program where the CEC paid for the consultants and the firms paid for other

fees. The CEC-GEMI greening the supply chain program, support the development of 65 in-house projects during the course of the two stages carried out thus far between August 2005 and December 2006. According to (non-verified) reports from these companies, they anticipate an accumulated savings of P$40,018,697 per year, as well as an annual savings of 70,982 m3 of water, 599 tonnes of paper and cardboard, and 78 tonnes of plastics. It is also anticipated that the projects will prevent the generation of 14 tonnes of hazardous wastes and the emission of 32.4 m3 of solvents each year, and that the energy saved will signify that approximately 2,299.1 tonnes of carbon dioxide (CO2) will not be produced.

The program design combines the best practices learned from prior experiences with mechanisms for training, technical assistance, implementation and financing, oriented toward promoting competitiveness through pollution prevention in productive chains. The initial results not only indicate economic and environmental benefits, but also demonstrate the program's effectiveness in building capacities in companies and cost-effectiveness in achieving the proposed objectives, as well as the acceptance of the program on the part of large companies and their suppliers.

3.4 Lessons learned

Customer pressure can be an effective impetus for managing industrial environmental performance, when those customers are located in countries with stronger environmental standards and cultures. Though foreign own companies seem to have better environmental performance and management in Mexico, they do so because of the pull effect from their foreign customers. FDI like trade liberalization does not automatically lead to clean technology transfer, greener supply chain, or help harmonize upwards toward global standards. Active policies are necessary to provide the proper incentives for firms to incorporate environmental protection into their actions. This is especially so for SMEs.

SMEs are typically far in the supply chain and receive little pressure from environmental authorities to improve their environmental standards. The spreading of environmental investment among smaller, domestically oriented, low-profile enterprises requires the comprehensive focusing of environmental and business development policies on small business, with the promotion of technology programs and cleaner production, including such economic instruments as tax incentives and preferential loans. To date, financing continues to be a problem for small business. Greater coordination is needed among institutions forming part of the innovation system oriented towards the environment and among enforcement and regulating agencies to simplify the administrative burden for SMEs.

In many developing countries the legal system and property rights are ill defined, a market approach maybe best (O'Connor, 1992). Training projects that bring upstream clients with downstream suppliers in greening their supply chain is one such example that seemed to have worked in Mexico along with a fund created to lend necessary funds to suppliers to lean and clean their operations.

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Built environment (1)

Chapter 3 Heat comfort and practice theory

Understanding everyday routines of energy consumption

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Abstract

This paper has both a theoretical and a practical idea and content. The theoretical aim is to use and develop practice theory from Schatzki, Reckwitz and Warde to be more applicable in understanding everyday routines. The theoretical development will focus on how routines exist in close association with the physical structures and technologies that are part of the practices, and also focus on understanding both the collective nature of practices and the internal distribution of differences within practices. The practical aim of the paper is to get a better understanding of the routines for regulating indoor climate. Heating in homes accounts for a substantial amount of energy consumption and CO2 emissions. The actual energy consumption is determined by the efficiency of the equipment as well as the way it is used. However, up till now not much research has focused on the everyday practices of ventilating and regulating the heat. Analysis in this paper builds on qualitative interviews with households living in identical houses, where those using the least energy for heating use one third of those using the most do. Focus is on describing similarities and differences in practices as well as understanding reasons for both similarities and differences.

1 Introduction

In Denmark, like in many other western countries, one third of all energy is consumed directly in the households and the majority of this relates to maintaining a comfortable indoor climate (Danish Energy Authority, 2003). Since the energy crises in the 1970s, policy efforts have used financial

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme..

instruments, campaigns and building regulations as a means in the effort to lower energy consumption for space heating. This has resulted in increased energy efficiency, meaning that energy consumption per heated square meter is lower today than 30 years ago, and that energy consumption for space heating has not increased despite a growing housing consumption (Danish Energy Authority, 2003). However, substantial reductions are needed in the future in order to meet the challenges of climate change. The actual energy consumption for space heating is determined by the heated area, the efficiency of the equipment and the use of the equipment. There is a long tradition within technical studies for studying energy efficiency in buildings (see e.g. the journal Energy and Buildings), whereas studies dealing with the growing housing consumption and the user aspects of the heating system are dealt with much less frequently. I have previously reflected on the growing housing consumption related to energy consumption (Haunstrup Christensen et al., 2007), but here I will focus on how users regulate their indoor climate, why they act as they do and how this influences the energy consumption.

There is not a lot of social science research dealing with space heating, energy consumption and indoor climate; however, there are a few studies that should be mentioned. First of all, Elisabeth Shove has persuasively shown, how preferences and practices of indoor climate have changed historically in response to the scientific and technological development of indoor-climate technologies (Shove, 2003). Furthermore Hall Wilhite and others have shown, how also cultural differences strongly influence practices and preferences of space heating by comparing practices in Japan and Norway (Wilhite et al., 1996).

A more classical sociological approach to the question of heating focuses on fuel poverty and how low-income homes deal with space heating. Studies from Great Britain document how poor people living in badly insulated houses are not able to maintain what others would consider a decent indoor temperature (Milne and Boardman, 2000; Burholt and Windle, 2006). In these cases efforts to insulate the houses will not result in lower energy consumption as much as in higher indoor temperature – and would thus be more of a welfare than an energy issue. It has also been shown that the average indoor winter temperature in Great Britain rose from about 14 to about 17degrees Celsius from 1980 to 1990 (Burholt and Windle, 2006), which is, however, still a lot colder than the approximately 20 degrees C. that is the norm in e.g. Denmark. The fact that there is a relation between the insulation of a house and the winter indoor temperature is also used in an economic argumentation to explain a seeming paradox: In colder climates, the indoor temperature is normally kept higher than in warmer climates, despite the higher cost of heating in colder climates. However, economic rationality can actually explain this paradox, as the marginal cost is lower in well-insulated homes, which are more common in colder climates (Friedman, 1987).

There are also a few studies focusing more explicitly on the daily routines of airing and turning the valves. A psychological study develops behaviour types based on whether people keep high or low temperatures and whether they keep high or low ventilation rates and it shows how these behaviour types influence energy consumption (van Raaij and Verhallen, 1983). Van Raaij and Verhallen also try to find socio-demographic determinants for each behaviour type; however, this appears less convincing.

A more recent German quantitative study looks for socio-economic household characteristics that can explain the non-technical terms of space heating (Schuler et al., 2000). Schuler et al. conclude that even though income and household size are significant determinants, their explanation of non-technical aspects of space heating is not convincing. A Swedish questionnaire and interview-based study concludes that among those that are able technically to regulate their heat, only one third used this to lower the temperature at night (Lindén et al., 2006). And in these cases the main reason for lowering the temperature is not concern for energy conservation as much as a preference for sleeping in a cooler room. Moreover, in another study the same authors conclude that there might be a tendency for women to prefer higher indoor temperatures than men (Carlsson-Kanyama and Lindén, 2007).

Thus some of these studies remind us that when dealing with indoor climate and space heating, it is should be remembered that the cultural and socio-technical construction of the topic is important, whereas other studies focus more on the individual determinants of understanding the differences in practices. In this article I will try to include both approaches and thus expand on the socio-technical ideas with a theoretical approach that can include a more individualist understanding.

In the following I will first give an introduction to practice theory as well as an explanation of why I find this a promising approach. Next is a short description of the empirical material that the study is based on followed by empirical analyses focused quite detailed on the everyday practices of regulating heat and ventilation in the home. This is followed by a more theoretical reflection on how practice theory can be expanded and developed to be useful in this kind of empirical analysis. Finally the paper concludes on the double ambition of theory development and heat practice understanding.

2 Practice theory in an empirical context

In recent research within consumer studies, practice theory has been used in an attempt to intensify focus on the routine and ordinary aspects of everyday consumption as compared with more conspicuous consumption (Warde, 2005; Shove and Pantzar, 2005). Furthermore, practice theory has also been used in understanding the limited effect of environmental information on changing everyday practices (Bartiaux, 2007). This literature draws on ideas from Schatzki (2002) stating that understandings of the social should be based on concrete practices, which are sets of doings and sayings, rather than on abstract structures. Also an article by Reckwitz (2002) plays a central role in elaborating this new practice theory defining actors as carriers of practices. Practice theory is, however, a fragmented body of theories that includes disputes of central questions like for example the role of things, technologies and the physical infrastructure (for a more detailed discussion of this, see (Gram-Hanssen, 2007)). Furthermore it has been argued that the way Schatzki and Reckwitz elaborate practice theory is quite unsuitable for empirical analysis (Warde, 2005). In this paper I want to contribute to the development of practice theory in a direction that can make it more useful in

empirical analysis. For this purpose I will describe the different elements in Schatzki and Reckwitz' description of the theory as well as the elements used by Warde and Shove-Pantzar in their more empirical analyses.
Reckwitz writes about practices that it:

> "….is a routinized type of behaviour which consist of several elements, interconnected to one other: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge." (Reckwitz, 2002:249)

In comparison Schatzki only counts on four elements holding practices together including: practical understandings, rules, teleo-affective structures and general understandings. Schatzki and Reckwitz agree that practices are social in the sense that they are something several people do, even though all the people doing that practice do not know of each other. . However, Schatzki also count on a more individual approach using practical intelligibility to describe what guides activities by individuals, which is basically what makes sense for the individual person to do – which is not necessarily the same as the four elements that hold practices socially together.

Table 1: Key elements in the understanding of practices.

<table>
<tr><th colspan="2">Schatzki, 2002</th><th>Warde, 2005</th><th>Shove-Pantzar, 2005</th><th>Reckwitz, 2002</th></tr>
<tr><td rowspan="4">Practical intelli-gibility</td><td rowspan="4">Practical under-standing</td><td rowspan="4">Understandings</td><td rowspan="5">Competences</td><td>Body</td></tr>
<tr><td>Mind</td></tr>
<tr><td>The agent</td></tr>
<tr><td>Structure/ process</td></tr>
<tr><td colspan="2">Rules</td><td>Procedures</td><td rowspan="3">Knowledge

Discourse/ Language</td></tr>
<tr><td colspan="2">Teleo-affective structures</td><td rowspan="2">Engagement</td><td rowspan="2">Meanings</td></tr>
<tr><td colspan="2">General understandings</td></tr>
<tr><td colspan="2"></td><td>Items of consumption</td><td>Products</td><td>Things</td></tr>
</table>

Warde more or less follows Schatzki's structure. However he renames the elements and excludes the item General Understandings, which was not part of Schatzki's vocabulary in 1996 (Schatzki, 1996). Warde also states that Schatzki's quite philosophical approach has to be developed in order better to include for example the experiences that individual actors have from participating in other practices (Warde, 2005). Experience can probably relate to both understandings and engagements. Furthermore the main idea of Warde's article is to see consumption as appropriation of items in the course of engaging in particular practices. Elisabeth Shove and Mika Pantzar in their article make their own elements without really reflecting on how they relate to the elements proposed by Schatzki and Reckwitz, even though they do refer to their inspiration from Schatzki and Reckwitz (Shove and

Pantzar, 2005); Shove and Pantzar focus on competences, meanings and products.

In Table 1 the elements proposed from the different authors are listed and related. The intention is to collect the content of the different approaches to be inspired for my empirical analyses and based on this overview I will propose to look for five relevant elements:

1. The individual and practical intelligibility. The concept of practical intelligibility is from Schatzki and it is relevant, because it makes it possible to distinguish between what guides individual activities and what holds practices together in the collective and social meaning of the practice concept. Activities by individuals are guided by practical intelligibility, which is basically what makes sense for the individual person to do, and the way it is guiding certainly does not have to be in the most rational or normatively correct way. Correspondingly, Reckwitz talks about the agent and the individual. The agent is the carrier of the social practices, and Reckwitz emphasises that agents understand themselves and the world around them and that they are neither autonomous nor completely ruled by norms. The agent can be distinguished from the individual, who is the unique crossing point of a multitude of social practices. My point here is that empirical investigation most often has to focus on the individual and the practical intelligibility that guides the many different social practices in this individual's everyday life, and then from this basis in the individual, the social practices might be analysed.

2. Practical understandings, body, mind, know-how. This is one of the basic elements in the understanding of practices. It is about knowing what to do, and knowing how to identify and react to something. It is routinied bodily and mental activities, carried out by or carried by practitioners who at the same time respond to the patterns that constitute this practice and contribute to sustaining and developing the practice.

3. Rules, knowledge, language. This is quite a mixed group, where the authors probably have different ideas of their concept. Schatzki writes that this only includes explicit rules of how to do things, what is allowed and what is not, thus not including tacit or implicit rules. The problem is that this makes it difficult to understand to which of his elements, e.g. other types of knowledge than tacit knowledge belongs. Warde translates Schatzki's term Rules into Procedures. However, I find this to be misleading and making it difficult to separate from practical understandings. Shove and Pantzar talk about competences and do not differentiate between tacit and verbal/theoretical knowledge, which I find not to be a satisfying way of solving the problem of distinguishing the two from each other. Reckwitz include knowledge and language/discourse, though, he emphasise that especially language/discourse looses its omnipotence as compared with its status in much cultural theory.

4. Engagements, meanings. Schatzki calls it Teleoaffective structures, a compound term made up of teleological and affective, meaning being goal oriented, where the goal is directed by normative views or moods. I find this word too complicated compared with Engagements or Meanings, by Warde

and Shove/Pantzar respectively, which I think illustrates this element well. Practitioners are engaged and mean something with the things they do, and this must be an important element of holding a practice together.

5. Products, things, technologies. Schatzki explicitly do not include the material structure, things or technologies as important in holding practices together; he rather considers it a result of social practices. As argued elsewhere (Gram-Hanssen, 2007), I find this to be a serious mistake. Warde in his turn focuses on things like items of consumption during participation in practices which I also find is too weak a position, and I thus rely on Reckwitz and Shove/Pantzar who bring in things and technologies as a much more important element for holding practices together.

In his efforts to make practice theory more empirically workable, Warde emphasises that the different elements can vary independently of each other within a given practice between those participating in the practice (Warde, 2005). Thus it is important to focus on individual differences as well as to study how these elements are learned, handed over and observed.

In the empirical part of the paper I will give a detailed description of the way different households regulate their indoor climate, and thus analyse this practice and its variations with the help of these elements. First, however, follows a short description of the frame and methods of this empirical material.

3 Methods

The empirical material in this paper is a re-analysis of a study conducted in 2000 and previously reported in (Gram-Hanssen, 2002, 2003, 2004). The study focused on 1000 households in a planned development with terraced houses built in the 1960-70s in Albertslund, one of Copenhagen's suburbs. Albertslund is internationally known for its environmental policy and efforts; one initiative has been every year to publish an eco-account. Among many other things this eco-account shows the average energy and water consumption in all neighbourhoods and for each neighbourhood a folder is also published showing the (anonymized) internal distribution of energy and water consumption on the households. As many of the neighbourhoods consist of a large number of identical houses, this allows the individual household to compare its own consumption with that of other families living in similar houses. From a research point of view, these eco-accounts raise further questions and provide opportunities for studying why one family can use three times as much energy as another family living in a completely identical house.

The study undertaken comprised a questionnaire survey of 500 households on their socio-economic status and possessions, behaviours as well as attitudes of relevance for energy consumption. The questionnaire results were combined with energy and water consumption as delivered from utilities. Based on these analyses, 30 households were selected for detailed measurements of indoor temperature, humidity and air exchange during two weeks in the heating season. Among these 30 households, ten were selected

for further in-depth qualitative interviews. The ten families were interviewed with an open question guide on their everyday practices in the house. Each interview lasted about two hours; they were recorded and afterwards transcribed. These ten households were selected to represent as big a variation as possible with regard to energy consumption, attitudes and socio-demographic description, while keeping in mind that more or less all people living in these terraced houses come from middle to lower middle class, and, compared with wealthy neighbourhoods with big villas, all have quite low levels of energy consumption. In this re-analysis I have chosen to include the five most information rich of the ten interviews (as regards indoor climate) allowing me to go more into detail with their individual practices. In the analyses names and other details have been changed in order to anonymize the interviewees.

The five households all live in owner-occupied two-storey terraced houses with a full basement. The size of each storey is 55 m^2. On the ground floor are kitchen and living room; on the first floor are three bedrooms and a bathroom and in the basement a big room for varying activities, a second bath, a sauna and a utility room. The houses are built in concrete with double glazing (as was normal in Denmark in the 1970s) and are quite airtight. Furthermore they all have central heating supplied by a district heating plant, and for hot water use they have a big water tank in their basement, also heated by district heating.

4 Different practices for regulating indoor climate

In the following five different families' use of the home, regulation of the heat and airing is described, as well as their knowledge of and interest in their heat consumption. Following this Table 2 gives an overview of the five households' energy consumption as well as their measured temperatures during a two-week period of the heating season.

4.1 Hot, cosy and easy

Per and Anja are in their late forties; he works as a non-skilled worker on night shifts and she as a home help, and they have two daughters in their early twenties still living at home. As expressed by themselves, they are home birds and put an effort into creating a nice and open home for their children and their friends. "It is important to feel good and be happy", Per says. They bought the house when they were expecting their second daughter and chose it because they got much space for little money. Per enjoys doing DIY and has improved both kitchen and bathroom. They like their house and especially the distribution of the rooms in the three stories: They are often in the basement, where they do different hobby activities, and it is nice to have this room where they do not have to tidy all the time. The living room on the ground floor is tidier and is primarily used for dinner and for reading or watching television, whereas the first floor is seldom used for anything but sleeping.

"Heat is something we use, not something we think about", Per says. However, when interviewed they seemed quite reflected about what they do

and why. They think they have 21-22 degrees Celsius in the living room and only little less in the basement "because when you are active you do not need as much heat". They prefer the bedroom to be cold, 10 -15 degrees Celsius. The heat is never turned on in the bedroom and the ventilator there (a part of the window that can be opened) is always open. The bathroom, on the other hand, they like to be warm. Per explains how they regulate the heat and it is obvious that he is the one in charge of this. This is probably related to the fact that he previously worked in a company dealing with residential heating systems. Per explains that the thermostat valves on each radiator are always at the same position, as they never touch them. In summertime when they do not need any heating, he has made a switch-system to decouple all radiators simultaneously in one time and only have heating for domestic hot water, and when the heating season starts, he switches all radiators on again without touching the individual thermostats. As a reason for why he acts like this, he says "otherwise, if you turn the radiators up and down all the time, you cannot control anything".

Concerning airing they explained that they normally open the terrace door and a window a few minutes to let in some fresh air. They do this a couple of times a day, at least when Anja comes home from work, after cooking dinner and before they go to bed. They explain that they need a lot of fresh air, because they smoke and Per also says: "to keep a good heating you need fresh air, fresh air is easier to heat than thick air". He also explains that they do not turn off the radiators when they air "you do not save anything by turning off radiators when airing, because after airing five or ten minutes, when you turn on the radiators again, they are still warm, so what have you saved: nothing". I asked them where their habits of airing comes from and they explained that they have probably heard on television or read in the newspaper that it is important to air, maybe they have learned it at home, and at least they think that they teach their children that airing is important. Anja tells how some of the homes, which she visits as a home help, do not air enough, and it is her impression that this is related to social problems, alcohol problems and unemployment: "You do not have energy to air if you have this type of problems".

Per follows their heat consumption and writes down every month how much they use. It is a routine and interest that he acquired in his previous work in a company dealing with heat systems. However, they do not really think about their level of consumption. He knows the eco-account from the municipality and sometimes consults it, so he is aware that they use more than the average household in their neighbourhood. As he remembers it, they use 10-12 MWh per year. To the question, whether the knowledge that they use more than others encourage them to save, he answered: "we like the way we live, and then some heat is needed. I do not want to economise on it, because what we can save in money is not very much (…), of course we do not use just for using, but we use what we think is needed to feel nice and comfortable (...) there is always cost involved in existing, so we just pay the cost".

4.2 Fresh air and enjoy life

Susanne and Frank are both office workers in their late forties. They have two children and the youngest daughter of 18 still lives at home. They have

moved several times and previously they owned a big older detached house, which they spent a lot of money and time to renovate and live in. When they decided to buy their present house, they prioritised a cheaper and easier house that allows them to focus more on their enthusiasm for sail sport. They spent "all their money" on a big sailing boat and have since then spent most of their summers on it, and they explain that after a summer it is difficult to get used to being indoors again – they really enjoy outdoor life. They are pleased with their house, even though they sometimes find the living room a bit too small. Their daughter lives in the basement and they spend most of the time on the ground floor including the terrace, if the weather allows it at all, whereas the first floor is used only for sleeping.

They do not like to have too much heat and many of their friends often complain that they have it too cold, and they are therefore surprised when I tell them that their heat consumption is among the highest in the neighbourhood. They say, however, that they find it difficult to regulate the heat. They like it real cold where they sleep "like penguins are knocking", whereas they like it warmer in their living room. However, Susanne does not like "closed doors and small rooms", maybe because she remembers how her parent focused much on closed doors in order to save energy and shouted at those who forgot to close them. Therefore the door between the staircase and the living room is always open. They think this probably means that the heat from the living room rises to the first floor making it warmer there than they like: "The first floor is stupid to heat. It is probably because we do it wrong. It is cold there, but there is also steam on the windows."

Susanne explains about airing. "Well I just closed the window when you arrived – it has been open for two hours – it probably means that the radiators are turned on. I do not know if I should turn them off"[1] . I ask why she opens the window for two hours and she answers: "Because I like to get fresh air – we live in concrete and the smell of cooking – it just need airing." She also tells how the ventilator (a part of the window that can be opened) in the bedroom is always open. If it is really cold outside, she sometimes closes it, but then they have steam all over the windows in the morning. "And that's wrong, then we have to turn on the heat and open the windows, but that seems wrong too" she says.

Susanne and Frank do not care about the size of their heating bill. No matter what, the bill is very small compared with what they used to pay in their previous house. Actually, they thought that their consumption was small compared with that of their neighbours, because they compare to their previous consumption and to their friends living in bigger detached houses. They say they know the eco-accounts from the municipality and think that it is a good idea, but obviously they have never studied them in detail, as they think their own consumption is at the lower end, whereas it is at the absolute high end. Furthermore they do not really care about the money they could save. Out of environmental considerations they think they ought to do something, but obviously this is not really affecting their everyday habits for regulating the indoor climate.

[1] The interview was conducted in the end of November and the outside temperature was 5-10 degrees Celsius.

4.3 Concerned but it is not that easy

Gitte and Hans are in their forties; she is a textile artist and he teaches history at the university. They bought their house when they expected their son nine years ago, and the main reason was the combination of low price and a big basement, where she can work with her textiles. They are pleased with their house in the sense that it suits their needs well, but Gitte is not very pleased with the style and materials of the house and the type of neighbourhood. She would have preferred an old brick house and a more socially integrated neighbourhood. They are often home and appreciate a functional home that suits their different activities, and they are not very concerned about interior decoration and DIY. The basement and the ground floor are the most used part of the house; the first floor is only used for sleeping and sometimes if their son has friends at home.

Concerning heating, Gitte was very focused, at the time of the interview, on a penalty tax that they have just received from the heating company, because they are not cooling the district heating water enough[2]. Both Gitte and Hans are obviously confused about what they do wrong and think it is difficult to understand. Hans thinks it has something to do with the fact that they do not use all their radiators; one in the entrance and one in the kitchen are newer turned on and only when it is very cold, they turn on the heating upstairs. They think they should use more radiators, but they also find it contradictory that it should be better to turn on more radiators. Furthermore Gitte tells how she often regulates the heat several times a day both in the living room and in the basement. In the daytime when she works, for example, she does not need so much heat as in evenings, though in the evening she also likes to sit under a blanket. It also relates to what mood she is in, but generally she explains that she prefers more heat than her son and husband do. The first years they lived in the house, they focused more on saving energy for heating due to lack of money; now they can afford more heat and as the house is actually cheap to heat, they do not think so much about saving.

There is not really any system for how Gitte and Hans air their house. As an example Gitte explains that often at the start of the heating season they wait to turn on the heat in the basement, until it is almost too cold and then it gets rather damp down there. To deal with this, Gitte then turns on the heat and also airs a lot. Otherwise she would normally turn down the heat when she airs, but it is not always that she remembers.

Especially Gitte is quite interested in and concerned about environmental problems, and in many ways she thinks about how to save and not pollute the environment. Her concern is basically a political conviction, and maybe it is also based on a reaction against her mother, who

[2] To have an efficient district heating (DH) system it is important that all households have as big a difference as possible between the DH water running into their house and leaving the house. To accomplish this, the households should use many radiators on lower heating rather than a few on higher heating. One radiator heating the whole house, thus, would need a very hot radiator, meaning that a lot of water would have to run through the radiator with a high in and an almost as high out temperature. Opposite this, many radiators heating a house means that each radiator have to produce less heat and thus need less water running through. The heating consumption in these two cases is the same, but the cooling of the DH water is different. Therefore the heating company uses a penalty tax if households are not cooling their DH water enough.

in Gittes view is much too focused on buying new things. Gitte explains that she can feel physically ill if she is shopping and thus she prefers second-hand. She knows about the eco-account from the municipality and appreciate that they are active on environmental politics. She also knows that their own level of heat consumption is at the medium level compared with that of the neighbourhood and that it has been going up in the last couple of years, but this does not really seem to worry her. However she feels that they need more information on how to heat their house and points to a collective solution. "If this was a proper neighbourhood, we would have a place and a tradition for meeting and discussing such things and we could invite someone from the municipality to explain about the heating system".

4.4 Want to save and know how

Jurek and Helena are immigrants from Poland, and have lived in Denmark for 12 years, half of the time in this house. He is a blue-collar worker in the chemical industry and she is in a nursery school teacher. They are in their late thirties and have two children of 8 and 6 years respectively. They consider their house to be a good compromise between, on one hand social housing with a bad reputation, which they were offered years ago when they needed housing, and on the other hand buying a detached house, which would need much more maintenance. He likes to do some DIY, not too much however, as they still have an old house in Poland to maintain and they want to have free time to spend with their children. They are often at home and then primarily use the basement and the ground floor, whereas the first floor is for sleeping; however, they also go to Poland a couple of weeks every year.

Depending on how cold it is outside, they normally turn off the heat every evening before going to bed or in the morning before leaving for work, and then turns it back on in the afternoon when they return home. It sounds like it is Jurek who determines this and Helena says "he gets quite upset if I forget to turn off the heat". He argues that they can earn money for their skiing holiday by remembering it, and that it is important not to waste money. On the first floor, the heat is never turned on when they are at home, and when they heat the ground floor, they always close the door to the staircase, as they like to keep it warm in the living room. Jurek explains that he is allergic to cold after his time in the military. The bathroom is the only place where they heat constantly and they are very pleased with their new bathroom with floor heating; sometimes they even do the bedtime reading for the children there. During the interview they started to discuss whether the new floor-heating system is good or bad for their cooling of the district-heating water, and it is obvious that they both are very familiar with the technical aspects and importance of this (see Note 2 for explanation). I asked where they had this knowledge from and they referred to a folder that was distributed to all households some years ago.

Also concerning airing Jurek and Helena are quite conscious and articulate about what they do. The ventilation (smaller part of the window) in the bedroom is always open. When they are not at home, all doors within the house are open to get a good circulation and also because Helena wants to be able to see into the living room in case of burglary when she comes home. When Helena comes home, she always airs the house by opening the door in

each side of the house a couple of minutes. She has learned this at a course arranged by the asthma and allergy union and is very focused on obtaining a good indoor climate because of their daughter's allergy. Furthermore Jurek opens the terrace door several times a day when he is home, because he goes outside to smoke. Jurek also states that "after letting in fresh air, it is easier to heat the room fast".

Both Jurek and Helena are concerned about their consumption and explain that they were raised in a culture, where they were not familiar with the use-and-throw-away culture of western countries. They have learned to save and think they can benefit from that. Jurek follows their heat consumption, and explains that from his work his is used to read different types of meters, so it is just a habit: when he sees a meter, he reads it. They also compare their consumption with that of others through the eco-accounts provided by the municipality, and find it satisfactory to see that they are at the very low end. They primarily focus on the economic aspect of saving energy, though they also find the environmental aspect relevant. Especially Jurek is sceptical of aspects of environmental politics like for example green taxes: "they are only there to collect money for the Exchequer" and furthermore he thinks that the municipality should focus more on their own behaviour than on the citizens' behaviour.

4.5 Just habits and a little concern

Helle and Erik are in their fifties and their son left home several years ago. Erik works as an official and often works evenings or nights and Helle is a part-time chemist's assistant. They bought their house 30 years ago when they expected their son, and has been pleased with it, but they probably have to leave due to the staircases, as Erik has problems with his knees. They are not often at home and even more rarely at home at the same time. If he works at night and sleeps during the day, she prefers to be away from home in order not to wake him, and she is often alone in the evening if he works. They enjoy going out together to the theatre etc., however, if they are home, they also like to have visitors.

They like not having it too warm indoors, and relate it to the fact that they are outdoor people, who are often out in nature. "When you then come home, it easily feels terribly warm". This family does not have thermostat valves on their radiators, which is quite unusual in Denmark. They manually regulate the radiators every day depending on whether they are at home or not. If they are not home – or awake – they do not heat, except if it is very cold outside. It is not difficult to remember, they say, it is just a habit they have. Furthermore they normally do not heat the basement, because it is well heated by the hot water tank. Several times they have considered installing thermostats on their radiators but never with enough enthusiasm to actually carry it through.

When they are not asleep, they always have airing on first the floor from the ventilation in the bedroom and a little window at the other end of the house. If they are not at home, all doors within the house are open to provide circulation. When Helle comes home, she closes the door to the bedroom before turning on the heat. In the evening they open the door to the bedroom and it easily becomes warm enough for sleeping. Helle believes in nature, she says, meaning that you should not have it too warm and that you

need a lot of fresh air. For example, before a good lunch with friends and family, they always go for a walk first to get some fresh air and exercise.

Erik follows their consumption, but it is Helle who is the most careful about turning off the valves. Erik does it out of interest, like he keeps a log of their fuel consumption for the car, but it is not really related to an interest in saving energy. He also compares their consumption through the eco-account, though it is not really important for them to know that their consumption is low. They just consider it to be a natural consequence of their way of living. I asked if it was the money that encouraged her to save heat, but Helle refused this: "No its not money, because heating is cheap in these houses anyway (…) its just silly to heat and open doors and windows (…) why not save a little for the environment." Helle believes that the habit of turning off the valves relates back to the energy crisis in the early 1970s and that it has just followed them since. For her it is the environmental argument that counts, but she also emphasises, that she is absolutely not religious about it.

4.6 Comparing interview with measured data

Comparing the table with the interview, it is interesting to note that the two households with low energy consumption are quite conscious of and systematic in their practice. There is very good correspondence between what they say they do and what we measure. Helle and Erik say that they only heat in evenings and if they are at home in weekends, and we can actually verify this. Correspondingly we can follow how Jurek and Helena turn the heating on and off every day, and have a high temperature every evening in the living room and the basement but otherwise keep low temperatures. Gitte and Hans have the lowest temperatures, though not the lowest energy consumption, which also corresponds to their explanation that they find it difficult to know how to regulate. Anne and Frank think they have low temperatures and low energy consumption, though our measurements show that both are actually quite high. This also corresponds to the impression from the interview that they are not really concerned about what they do or what they consume. Finally, Per and Anja have the highest energy consumption, which corresponds with the fact that they like to keep it warm, and that they do not care if their consumption is high.

Table 2: Measured yearly heat consumption and room temperatures. "Steady" temperature variation means that the temperature is normally at the same level; whereas "vary" means that there is a more or less systematic variation in the temperature, where you can see for example that they lower the temperature at night.

	Heat consumption	Ground floor, average	Ground floor, max	Temperature variation	Basement, average	First floor, average
	kWh	°C	°C		°C	°C
Per and Anja	14600	20.5	22.1	steady	20.8	18.9
Anne and Frank	*14000	20.3	21.4	steady	20.4	18.1
Gitte and Hans	10300	18.5	20.2	vary	18.4	18.1
Jurek and Helena	4900	22.0	24.7	vary	20.9	16.9
Helle and Erik	4000	19.0	22.7	vary	17.5	16.0

(*This heat consumption is reduced by 75% making their consumption comparable with the others, because they live in an end raw house)

5 Empirical reflections on the theory

These five stories on the practice of regulating the indoor climate on one hand show similarity and collectivity and on the other hand show variety and individuality. Practices are collective and therefore it is relevant to focus on, and describe, the elements that hold the practices together as collective practices. Still practices in this study are explored through individuals with each their own story of why they do as they do, and these stories show how individuals have different experience with other practices that influences what they do as well as having different meanings, knowledge and understandings. In the present case study, the technology or products (the house and the heating system) of the practice are similar and this makes it easier to focus on other reasons for the differing practices.

The house, the heating system and the whole district heating infrastructure are the material elements of the studied practices and we are interested in understanding the relation between practice and material structure. This relation should of course not in any way see technology as determining a certain practice, therefore one approach could be inspired by Giddens' structuration theory (Giddens, 1984), to see material structures as enabling and constraining certain practices. Though in Giddens' terminology this is rather used in relation to the social structures than the material structure. Schatzki opposes this and uses the notion of prefigure to describe the way that the social present channels forthcoming actions (Schatzki, 2002:XV). Prefigure is something that makes some actions easier or harder, shorter or longer, acceptable or not compared with other actions (Schatzki, 2002:225). I see the difference as Giddens' notion of enabling and constraining focus more on the actor that can be enabled or constrained in doing something whereas prefigure focuses more on the structures, though, still not in a deterministic sense. I will here focus first on how the layout of the houses prefigures the use of it and second on how ventilation and heating systems prefigure certain habits.

That the arrangements of the houses prefigure certain ways of using it can be seen from the fact that all families seem to use the first floor for sleeping, and the ground floor for living room, which is probably also the way the architects of the house planned it when they designed the house. Furthermore this is also within the cultural norms of a modern arrangement of a home – individual bedrooms for parents and children and a common living room. The basement in these houses is, however, more flexible, and all the interviewed really appreciated and used the basement. As there is no widespread cultural norm indicating the use or necessity of this room, it is open for interpretation and varies with interests and household composition. Adults use it for hobby or work, or to sleep in if you work night shifts and want more darkness and quiet. Smaller children use it as a playroom, where toys do not have to be tidied up after each use and later it is used as a teenager's room where they can live farther from the rest of the family. The houses were originally built with a sauna in the basement, but some have later removed it, and even those who still have it, never really use it. Thus this is an example of how, a certain use never comes into practice, even

though the house was built for it. Culture might be an explanation as it is obvious to imagine that if the houses were built in Finland, where there is a strong sauna culture, the saunas would probably have been used much more. This case study thus presents examples both of how the layout of the house strongly prefigures practice, how the layout is open for interpretation or how it does not influence practice at all depending on the direction that cultural norms pull in relation to the same practice.

Concerning how the heating system influences practices, there are also examples of habits that are common throughout the interviews and habits that are individual. What is common and what seems to be prefigured by technology is the way the first floor is ventilated. All interviewed always kept the ventilation open in the bedroom and combined with the fact that the heat rises from ground level to the first floor gives some similarities in the way the houses are heated and ventilated. The differences are most strongly related to how the radiators and the doors are operated. Some always keep inside doors open or leave valves in the same position, whereas others open and close doors and valves regularly either in a chaotic or in a systematic way. Some choose their habits consciously, whereas others do it more randomly and impulsively, in both cases the understanding here relates to what in the theory is described under the heading of practical understandings, body, mind, know-how. Below I will continue discussing this. Another difference of how the heating system is used relates to how many radiators that are turned on at the same time, and as previously described this relates to the question of cooling the district heating water and the technical knowledge of how this works. This question will therefore be dealt with in relation to the discussion of what in the theory is called rules, knowledge and language.

All the interviewed households are carriers of the practice of indoor climate regulation, and they perform different bodily doings with radiator valves, doors, ventilators and windows every day without really considering it. In the interview situation they were asked why they do as they do and in this way they are asked to do a post-rationalisation of their routines. In the analysis we have to be aware that the interviewees' own rationalisation is not necessarily the same, as what we from a theoretical point of view call elements that hold practices together, so therefore the notion of practical intelligibility from Schatzki is also useful to remember. For example when Per says that they never turn on the radiator valves, "because otherwise you cannot control anything", I understand it as practical intelligibility, which is how the individual explains his/her routines so that they seem rational to themselves. However, in the interviews there are also examples of how people do not try to explain their habits as much as to associate them with other habits. Some of the interviewees thus recall experiences from other practices as part of the explanation why they do as they do. Two of the men thus relate their indoor climate habits to experiences with valves and meters from their workplace. Many people also recall experiences from their childhood of how their parents practiced indoor climate regulation, and their own habits can either be seen as a reaction to or a continuation of this. One of the families relates to their previous experience of heating in a big old and expensive-to-heat villa. Finally the interviewees also stated that their habits are influenced by campaigns and other types of knowledge that they have

previously embedded so that they now are part of their practice without being reflected on.

Rules, knowledge and language within indoor climate are institutionalised and disseminated within different institutions and channels that influence practices in different ways, though not in any direct "communication-change-behaviour" understanding. The institutions that produce or establish the knowledge include research institutions, governmental bodies and energy or asthma NGOs, and those who help bringing this knowledge out into daily life furthermore include local authorities, schools, news media and utilities. For example some interviewees referred to campaigns back in the 1970s to keep a lower indoor temperature, and others referred to courses on how to keep a healthy indoor climate in order to reduce allergies to house-dust mites. For some of the interviewees, who refer to experience gained from other practices, this also might be viewed as transfer of knowledge from one practice to another. In other cases it might as well be bodily know-how that is transferred more than explicit knowledge. On the question of how and why to maintain a good cooling of the district heating water, some of the interviewees explain that a couple of years ago they received a folder explaining about this from the utilities and they think this influenced their routines. Another family explains that they received a penalty tax for not cooling enough from the same utility and this will probably mean that in the future they learn to maintain a better cooling of the district heating water. Though it is not very obvious, how practice theory considers economic instruments and consequently which type of element it belongs to, other economic instruments might probably be considered as a way of changing engagements and meanings rather than forcing acceptance of knowledge. In relation to knowledge, several of the interviewees also refer to the general knowledge that you get from television and newspapers, and this specially concerns knowledge of the relation between heating, energy consumption and environmental problems. However, this type of knowledge dissemination might rather be viewed as information influencing attitudes. Finally a special type of knowledge from this case study is highly relevant which is the feedback from the eco-accounts indicating how much energy the household consumes and how this compares with other households' consumption. From a practice theory point of view it can be discussed whether this is to be viewed as knowledge or as a moral or economic instrument.

Finally the last element that holds practices together is engagements or meanings. In relation to indoor climate the interviews point to several different sub-fields or related practices of relevance, including the question whether environment is important, whether saving is important for what-ever reason, the meaning and importance of the home and how it relates to heating, different meanings of heating as natural, healthy or cosy, and a technical interest and satisfaction in doing the right thing technically. The question of environment as a reason for saving energy is brought up during the interview by several interviewees. Not as something they normally think about when actually practicing heat consumption, but as something that means something to them and that they consider as background for how they have decided or chosen different ways of performing the practice. For Helle and Erik, and for Gitte and Hans, environment is obviously an important part of understanding their practice. For Helle and Erik this results in much less

energy consumption than for Gitte and Hans. This in spite of Gitte and Hans being much more environmentally concerned, which is a reminder to us that engagements and meanings are only part of what holds together and influences practices. Furthermore it also highlights that engagements and meanings are different from knowledge and technical understandings. It is absolutely possible to be highly engaged in the environment without knowing technically how to influence the level of your energy consumption, as it is also possible to be technically interested in doing "the right thing" without being especially environmentally concerned. Another engagement which sometimes relates to environment, but not always, is how people feel about savings. For some this is related to a positive feeling of doing something morally or economically right, and often it is a deep-rooted feeling relating to childhood experience, resulting in a physical discomfort at over-spending. This was evident especially in the case of Jurek and Helena, who themselves related their preference for saving rather than spending to their economically less favourable background in Poland, whereas for example Gitte, who also favours saving and talks directly about physical uneasiness about consuming things, this is based much more on a political and moral decision about consumption and environment.

Environmental, technical and economic interest in saving is only one aspect of the meanings and engagements that are important for practices of heating and indoor climate. The meaning and importance of the home thus also have a strong relevance for understanding these practices. When Per and Anja describe themselves as home birds and emphasise the importance of maintaining a cosy and welcoming home, this also means maintaining a rather high indoor temperature, whereas Anne and Frank emphasise that for them their home is only one of two places, where they enjoy staying. In summertime their sailing-boat is their place of preference and this also means that for them fresh air rather than high temperature is what they appreciate in their home. The last aspect of engagements and meanings relates to questions of indoor climate and health. Some of the families have family members with allergies and are therefore very focused on healthy indoor climate in a scientific meaning with focus on low humidity preventing house-dust mites from surviving, whereas others have a kind of folk-belief approach to what is healthy or unhealthy. Several thus argue that having a lower indoor temperature is more natural and many associate sleeping with fresh air and low temperature especially with healthiness and naturalness.

In this section I have now used the five elements, that I listed as a conglomerate of different authors' presentation and use of practice theory to analyse the practice of heating and indoor climate. I think this analysis has shown a way in which practice theory can be useful in revealing interrelated elements of what holds together and constitutes practices, as well as what differentiates within a practice. Concluding this section, however, I want to point to a few relevant aspects from the case studies, which have not been quite adequately dealt with in this approach. One thing relates to what could be described as human biology. Some, maybe especially the women, explain that they need more heat than the rest of the family in order to feel comfortable. In some social construction approaches, this could be interpreted as a merely cultural phenomenon, for example women being less active and wearing less clothes than men, or as a construction of preferences,

where the two genders are differently constructed in all aspects of life and thus also relating to heat comfort. In a theory dealing with materiality as a factual thing, and as such including science and technologies as more than mere constructions, I believe it should also be possible to include human biology neither as a mere construction nor as a mere scientific fact. The other thing missing in this approach is how to consider economic aspects. Tax and duties are used as one of the basic instruments for influencing consumer behaviour towards energy savings; however, it is not very clear how to interpret the effect of this within practice theory. Above I have proposed to see economy as an aspect of engagements and meanings, but I do not find this really satisfactory. And a last question is whether social stratification is a bit too underplayed in this approach? I believe that the most adequate way of dealing with it is to analyse for differences within status groups in all five elements of what holds a practice together.

6 Conclusion

Practice theory has been at the centre of this article and it has been argued that this theoretical approach is especially interesting, because it is able to see the collective nature of practices as well as the individual differentiation and because technology can be included. It has also been emphasised that up till now the presentation of practice theory has been quite remote from its empirical use. In this article, practice theory has been used to analyse the practice of regulating heat consumption and indoor air quality and this analysis has provided insights into both the studied practice and theory.

In relation to the practice of heating and indoor climate, the analysis points towards four elements that constitute this practice. First there is the bodily know-how and routines of regulating radiator valves and windows, which is at the centre of understanding the practice and which is where we see how the actors are carriers of routines that are collective in their nature, though at the same time open for individual differences. Secondly, technologies are an absolutely necessary part of this practice. Without houses and heating systems there would be no practice of regulating heat and indoor climate, and obviously the actual design of these technologies are of importance for the practice. The analysis shows how technology design can prefigure a certain practice that makes something easier, shorter or more acceptable than other ways of doing it. However the analysis also shows how technologies can be interpreted and used differently depending on differences in for example knowledge or engagements. Knowledge is the third element that holds practices together and here is meant explicit institutionalised knowledge of for example airing and health or correct cooling of district heating water. The practice-oriented knowledge learned through participating in the practice with others, like for example the know-how of regulating valves, typically learned in childhood, belongs to the first element described above. The fourth and last element holding this practice together is engagements, and maybe especially within this element we find differences between the practitioners. Engagements relating to heating and indoor climate concerns different subjects like environmental concern, health concern, different ideas of the home and economic considerations.

Through adjustment and discussion of the basic elements in practice theory and afterwards a detailed empirical analysis of an ordinary, taken–for-granted and not-often-studied subject, it has been shown how practice theory might be brought into empirical use. The theory has thus helped structuring an understanding that incorporates the many very different and unequal elements found in the stories of how and why people regulate their heat and indoor climate. As a general conclusion about empirical analyses of practices, it may be important to emphasise that other practices may show other weightings of the importance of the different elements.

Acknowledgement

First I wish to thank the interviewees who agreed to tell their stories of energy consumption in their everyday life. I also want to thank senior researcher Ole Michael Jensen and Niels Christian Bergsø, Danish Building Research Institute, for assistance in the data collection and analysis of the heat consumption and temperature measurements. Finally I thank the Energy Research Programme for funding the original project in year 2000, and The Danish Social Science Research Council for a grant to re-analyse previous empirical material.

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Chapter 4 Household energy consumption and behavioural change - the UK perspective

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1 Abstract

Residential energy consumption is responsible for 27% of the UK's carbon dioxide (CO_2) emissions. As energy consumers, people do not simply consume gas or electricity in their homes, but rather the services that energy provides. There has been a significant increase in energy consumption per household, related to the increase in household numbers and changes in lifestyles. High emissions from the UK residential sector are partly a consequence of old, inefficient building stock. However, households' energy behaviours form another and in many respects a more challenging problem.

Previous research on household energy consumption suggests that feedback on energy use has the greatest potential to influence households' energy behaviours. Once people receive feedback on their consumption, they may be more likely to change their attitudes and behaviour. A limited number of feedback studies have been conducted in the UK. However, the UK Government has recently announced trials which pilot smart meter and display technologies as a way of providing feedback and thus potentially influencing UK households' energy consumption. This paper looks at the experience of previous research and how this can provide insights to the UK Government's smart metering programme, as well as suggestions for further research in this area.

2 Introduction

The main objective of this paper is to summarise a review of studies on household energy consuming behaviours conducted mainly in the US and what lessons can be learnt from these in the UK context. Before considering the behavioural challenge related to households' energy consumption, the paper outlines the context of household energy consumption trends in the UK over the past 30 years. Two behavioural models are also discussed, the

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium. Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme

Attitude-Behaviour-Context model and Triandis' Theory of Interpersonal Behaviour.

As energy consumers, people do not simply consume gas or electricity in their homes, but rather the services that these energy sources provide - including heating, cooking, lighting, washing and using electrical appliances. There has been a significant increase in both gas and electricity consumption per UK household, as well as in relation to total energy consumption from households, related to the increase in household numbers. Household energy consumption will need to be significantly reduced if the UK is to meet its objectives for reducing CO_2 emissions. Domestic buildings alone account for 27% of UK's CO_2 emissions (DTI, 2007), which are partly a consequence of the UK's old and inefficient building stock. However, inefficient building stock and the growth in incomes and household numbers form only part of the problem. The challenges associated with changing household behaviour form another and in many respects more challenging one.

The key issues to consider are how households' energy using behaviours can be best influenced with the goal of reducing energy consumption and CO_2 emissions, and how to ensure that any new behaviours are maintained for the long-term. This paper also reflects the challenges of behavioural change measures and how they link to UK's energy efficiency policy. Technological developments within the infrastructure which frames the UK's energy supply, especially the introduction of smart meters and display units, are also discussed. The UK was chosen as case study as it is a good example of a consumerist and a liberalised market society, which largely influences the ways energy is produced and consumed in this country. However, challenges of today's energy policy facing the UK are also relevant to other countries, particular those where consumerism has made or is about to make a strong imprint on people's lifestyles.

3 Methodology

The methodology used for this paper is based on a desk study, which reviewed academic and policy literature on pro-environmental behaviours, energy efficiency intervention measures, and policy measures. The review of behavioural literature forms a large part of this paper, particularly academic and policy literature on domestic energy consumption. In addition to intervention studies on energy consumption, psychological behaviour models were reviewed. There are several good existing reviews available on household energy intervention studies (see particularly Abrahamse et al., 2005, Darby, 2006, Dwyer et al., 1993), which were used as a basis for the literature review on intervention studies. Several economic and social-psychological models and theories have been developed on human behaviour, particularly in the field of sustainable consumption. An extensive review of behavioural models is available from Jackson (2005).

The literature review on UK's energy efficiency policy includes key Government policy documents and reports, as well as a review of relevant EU policy and legislation. This paper also includes case studies from the US where behavioural measures have been used successfully in encouraging household energy saving.

4 Household energy consumption trends in the UK

Household energy consumption contributes to around 27% of UK's CO_2 emissions (DTI, 2007), a figure which is likely to increase over the coming years unless immediate action is taken to reduce emissions from fossil fuel based energy sources.

4.1 Housing stock and its impact on CO_2 emissions

Partly responsible for the increased use of energy and related emissions from households is the UK's building stock, especially existing old housing stock. It is estimated that out of today's 24 million UK homes, 21.8 million will still be existence in 2050 (Boardman et al., 2005). Furthermore, another 10 million new homes, equal to around 220,000 homes each year, are estimated to be built by 2050, a potentially large contributor of CO_2 emissions from both construction and household energy consuming behaviours (Boardman et al., 2005).

Many people in the UK are 'locked-in' to poorly built and inefficient houses, thus having little control over the emissions their homes produce. The majority of existing housing stock is old and inefficient, and hardly meets average energy efficiency standards. The Standard Assessment Procedure (SAP) rating is used to assess the energy performance of buildings, based on the house type and layout, and presented on a scale from 1 to 100. A score of 80 or more indicates an energy-efficient home and a score of 100 a highly energy-efficient home (Wright, 2004). Even though most new homes built in the UK achieve ratings of 80 or above (Wright, 2004), there are approximately 2 million UK homes which have a SAP rating below 30 and the average existing UK home has a rating of around 50 (Boardman et al., 2005). The UK Government has indicated that by 2016 all new homes should be zero carbon while those being built before that will meet higher energy efficiency standards (DCLG, 2006a, b). Furthermore, in Budget 2007, Chancellor Gordon Brown announced that zero carbon homes which cost less than £500,000 will be exempt from stamp duty, while zero carbon homes of value less than £500,000 will receive a £15,000 stamp duty reduction (HM Treasury, 2007).

Despite Government signals to encourage low and zero carbon homes, there is a lack of confidence in these statements and that they will actually deliver better housing stock. There is evidence that existing Building Regulations, particularly Part L which covers energy efficiency standards, are not taken seriously by the building trade, or being enforced by local planning authorities. For instance a survey by Future Energy Solutions (2006) found that Part L is not a priority for builders and that there are several areas which do not comply with the regulations: '…thermal bridging is the most frequently cited area of non-compliance. Conservatories, u-values of constructional elements, internal lighting, and windows, doors and roof lights closely followed these' (Future Energy Solutions, 2006, pg. 38). In other words, new houses being built in the UK do not necessarily comply with Building Regulations requirements for energy efficiency and more than often these regulations are not enforced, leaving it possible for builders to construct inefficient houses.

4.2 Consumption trends add another angle

In addition to the quality of existing and new housing stock, the increase in energy consumption is also linked to technological developments, economic growth, as well as cultural changes (Abrahamse et al., 2005). People in the UK may live in inefficient houses, but generally they are more comfortable - the use of central heating has increased considerably since the 1970s and households have a range of electrical appliances. The average internal temperatures in centrally heated UK homes have increased from 13.8 degrees Celsius (^{o}C) in 1970 to 18.2 ^{o}C in 2004, meaning that over half of today's household emissions are linked to space heating, much of which is based on gas supplies (see also Figure 1).

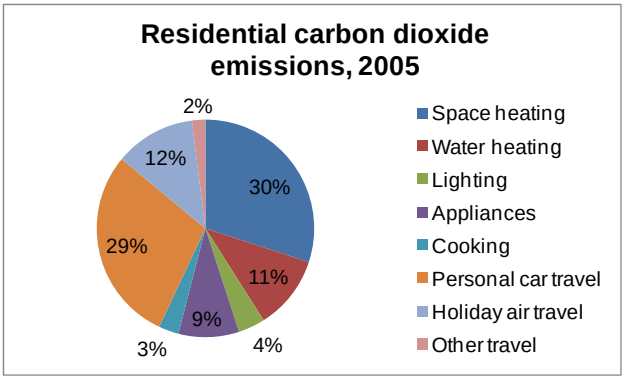

Figure 1: UK's residential carbon dioxide emissions (DTI, 2007)

Economic growth and cultural changes, especially trends in fashion, have also meant that people in the UK consume more products than they used to 30 years ago. While in 1970 a typical UK home had an average of 17 electrical appliances in their homes, that figure had risen to 47 in 2004 (see Figure 2). Households are not only increasingly heating their homes, but also using more products which require electricity for their operation. Some of these are based on convenience (for instance tumble dryers) while others are more in line with the latest fashion in consumer trends (personal electronics).

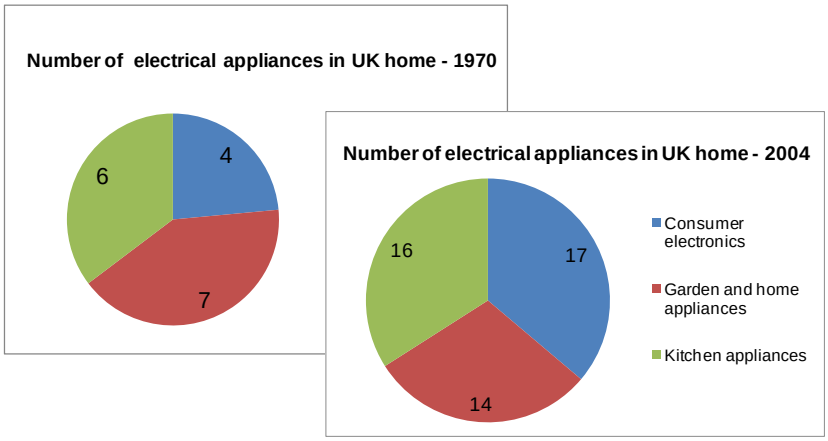

Figure 2: Trend in electrical appliance ownership in the UK in 1970 and 2004 (DTI, 2007)

While white goods are labelled according to their energy usage and almost 70% of cold appliances sold in Europe are rated at either A or A+ (the highest level) for their energy efficiency (Bertoldi and Atanasiu, 2007), majority of consumer electronics, however, remain without energy labelling. Furthermore, appliances used in the home are rarely switched off - over 70% of UK households regularly leave appliances on standby (EST, 2006). One of the problems of domestic energy use, which has been identified several times in previous research (Abrahamse et al., 2005, Darby, 2006) is that energy use in the home is not visible. People are used to turning the heating on and using electronic appliances as they wish, without having to consider where the energy to power them comes from, or what the implications of that energy use might be.

Furthermore, Roberts and Barker (2003) have identified a 'direct-debit' dilemma in the UK. Increasingly people today pay their energy bills by automatic payments from their bank account, which means that households do not necessarily need to open electricity or gas bills. For many people there is no need to be aware of how much they gas or electricity they may be using and how much they are spending on their bills, as long as they can afford their bills. Consequently, people fail to make the link from their everyday behaviour at home to increased fossil fuel use, carbon emissions and ultimately climate change. Despite the invisibility of domestic energy use, people in the UK are increasingly aware of climate change as a phenomenon, so making the link from their everyday behaviours at home to carbon emissions and climate change becomes even more vital. Darby (2006) especially has argued that giving people feedback on their energy use is one way to start visualising that usage which may also have the potential to change behaviour.

5 Changing energy behaviours

5.1 What is behaviour?

Before moving on to the various measures by which energy consumption in the home could possibly be influenced, it is important to identify what is meant by energy using behaviour(s) and how these could potentially be categorised. In the context of this study, behaviour, or more importantly behaviours, are defined as electricity and gas use in the home. These include actions such as using electrical appliances including televisions, computers, washing machines and personal electronics. It also includes using lighting and setting the thermostat level. So in other words, energy consuming behaviours are actions taken in the home which have direct links to either electricity or gas being consumed at the point of usage. Energy consumption in itself is not behaviour, but rather a consequence of behaviours (Becker, L. J. et al., 1981).

It is also important to identify how our behaviours are formed and how they could potentially be influenced. Behaviours can be considered from an economics perspective, i.e. people's energy consuming behaviours are linked to and have monetary impacts; or from a value approach, i.e. energy consuming behaviours are linked to and have environmental impacts which are of concern to people. Previous research has suggested that household energy saving behaviours could be divided in the following two groups:

Table 1: Types of household energy saving behaviours (see for example Abrahamse et al., 2005, Dwyer et al., 1993)

Behaviour type	Examples
Efficiency behaviours	One-shot behaviours - investment • loft insulation • cavity wall insulation • Double-glazing
Curtailment behaviours	Repetitive efforts - operational • Turning lights off • Closing curtains • Turning appliances off

There is not enough evidence on whether curtailment or efficiency behaviours are more effective in producing energy savings (Abrahamse et al., 2005). Some researchers argue that curtailment behaviours initiate actual behavioural changes, which can potentially be sustained for long-term (for instance Geller, 2002). However, recent research has suggested that efficiency behaviours are in fact generally more effective in obtaining actual and larger energy savings (Abrahamse et al., 2005). Interventions measures which could potentially initiate these behaviours are discussed later.

5.1.1 Habits of a lifetime?

Whether our energy behaviours are one-off actions or continuous actions, these behaviours are influenced by wider societal, as well as personal factors. Our behaviour is influenced by both internal factors (attitudes, beliefs, norms) and external factors (cultural practices, regulations, institutions) (Jackson, 2005). In order to change people's behaviour related to the environment, both internal and external influences on behaviour need to be taken into consideration (Gärling et al., 2002).

Part of behaviour are also habits and routines - the actions people undertake without really having to think about them. These are particularly relevant to domestic energy use. Many of the behaviours related to domestic energy use are based on habits and routine, such as turning the lights on/off, using appliances (e.g. boiling the kettle, using the washing machine) and heating systems (setting the thermostat level). In order to change habits and routine behaviours, old habits and routines need to be broken down before new ones can form (Stern, 2000). However, habits and routines can be very difficult to break as they are ingrained in people's behaviour - hence selecting the best measures to encourage behavioural change in domestic energy consumption can be challenging. There is some amount of evidence however from empirical energy consumption research, as well as from other pro-environmental behaviours (such as recycling), that behavioural change can take place under the right conditions and can be influenced by public policy. Before moving on to the various intervention measures which have been used to influence behaviour, two models of behaviour are discussed.

perspect

5.2 Models of behaviour

There are several economic, social and psychological factors which influence behaviour and economists and social-psychologists have developed various models and theories in order to understand how those behaviours are formed. An extensive review of models and theories relating to sustainable consumption behaviours is available from Jackson (2005). In the context of this study, two models were chosen for further examination, the Attitude-Behaviour-Context model initially developed by Stern, Guagnano, and Dietz (Guagnano et al., 1995, Stern, 2000) and Triandis' Theory of Interpersonal Behaviour (see Jackson, 2005).

5.2.1 The Attitude-Behaviour-Context model

As discussed previously, both internal (attitudes, beliefs and personal norms) and external (regulation, institution, culture) factors influence our behaviours. In order to fully understand behaviour, we need to look at models which combine both internalist and externalist perspectives (Jackson, 2005, Stern, 2000). In this context the Attitude-Behaviour-Context model is discussed, as it has been used in empirical pro-environmental behaviour research (Stern, 2000).

The Attitude-Behaviour-Constraint (ABC) model of environmentally significant behaviour is based on the understanding that 'behaviour is a function of the organism and its environment' (Stern, 2000, p. 415). Or in other words, behaviour (B) is an interactive outcome of personal attitudinal variables (A) and contextual (C) factors (Jackson, 2005). Attitudinal variables include beliefs, norms, values and a tendency to act in certain ways, while contextual factors include monetary incentives and costs, physical capabilities and constraints, social norms, institutional and legal factors (Jackson, 2005). The main dimension of the model is the interaction between attitudes (internal) and contexts (external). The model has been used for instance in the context of recycling:

'when access to recycling facilities is either very hard or very easy, it scarcely matters whether or not people hold pro-recycling attitudes. In the first case, virtually no-one recycles; and in the second case most people recycle. In a situation, however, in which it is possible but not necessarily easy to recycle, the correlation between pro-environmental attitude and recycling behaviour is strongest' (Jackson, 2005, pg. 93). See also Figure 3 below.

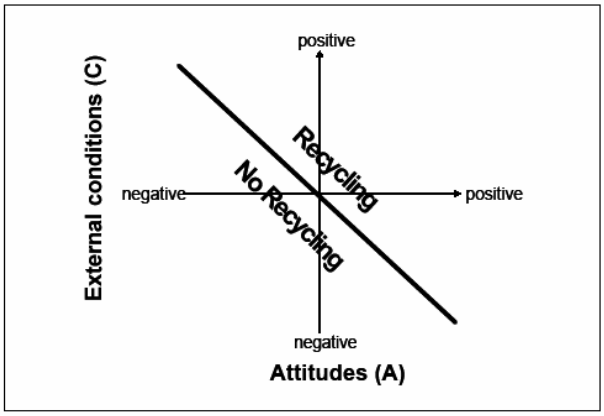

Figure 3: The Attitude-Behaviour-Context model as applied to recycling (Jackson, 2005).

This has been shown in other studies too, and in the case of domestic energy conservation, the influence of social-psychological variables such as attitudes declined as effort or cost increased (Stern, 2000), so the more difficult the energy conservation behaviour was, the less influence positive attitudes towards it had.

Stern points out that even though the ABC-model is wider than some of the earlier economic models (such as the rational choice theory which is based on the idea that as long as people are informed they will always make rational choices), the ABC-model does not take into consideration habits (Jackson, 2005, Stern, 2000). Stern acknowledges this, especially in the case of behaviours relating to domestic energy consumption (Stern, 2000), with the previously discussed notion that in order to change behaviours based on habits and routines, old habits need to be broken down and new ones formed. Furthermore, Stern identifies four different types of causal variables for environmental significant behaviours: attitudinal factors, contextual factors, personal capabilities and habits/routines (Stern, 2000). Models such as Triandis' Theory of interpersonal Behaviour, which is discussed next, reach wider than the ABC-model, by recognising the importance of habits.

5.2.2 Triandis' Theory of Interpersonal Behaviour

Triandis' Theory of Interpersonal Behaviour was developed in 1977 and differs considerably from the 1970s general behavioural research trends of rational choice theories (see more in Jackson, 2005). Triandis' model is based on the notion that intentions, habits and facilitating conditions (external factors) influence behaviour. According to Triandis' model, behaviour in any given situation is a function of what a person intends, what his/her habits are, any situational factors and the conditions in which the person operates (Jackson, 2005). Person's intentions are influenced by rational thought, and social, normative and emotional factors and the model also takes into account person's beliefs about what the outcome of their behaviour will be (e.g. if I turn the lights off, I will save electricity and it will save me ££ amount of money).

perspect

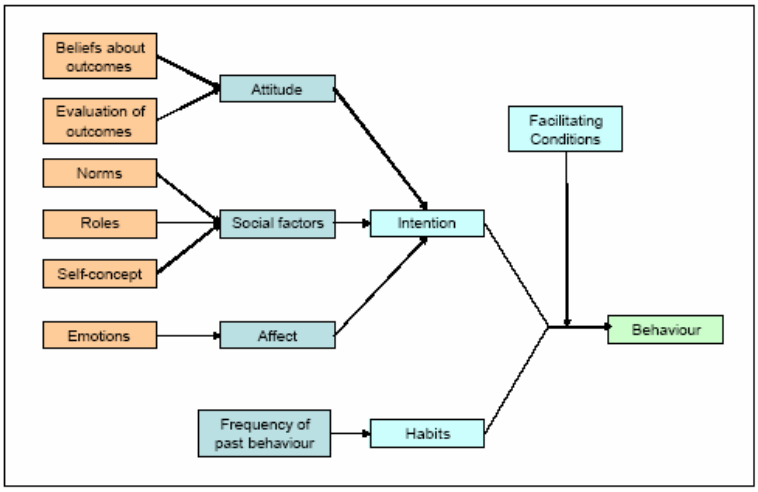

Figure 4: Triandis' Theory of Interpersonal Behaviour (Jackson, 2005).

The interesting point of Triandis' model in relation to domestic energy use is that it takes into account intention, but more importantly recognises the influence of habits, which are relevant in the case of domestic energy consumption as discussed previously. In the UK for instance almost 70% of households regularly leave appliances on standby (EST, 2006), while electricity and gas bills can be taken directly from customers' accounts (Roberts and Baker, 2003), giving them a chance to get into the habit of not having to open, read or be aware their energy bills.

Triandis' model has been used in some experimental environmental research, for instance in defining whether morals and habits have an influence on students' car use (Bamberg and Schmidt, 2003). However, as it is more complex than some of the more simple behavioural models such as the ABC-model, Triandis' model has not been widely in experimental research (Jackson, 2005). However, it offers a comprehensive explanation of the complexities involved in behavioural research and the variables that influence our behaviours, and will potentially need to be changed in order to change behaviours as a whole.

The key question in relation to this paper is how to define the right measures which will make people change their energy consuming behaviours? In relation to the models discussed above, McMakin et al. (2002) found that people are more likely to carry out energy efficiency behaviours under certain conditions:

1. people value energy efficiency measures more if they have benefits to themselves (beliefs about outcomes)
2. energy use and savings must be visible, provide goals and motives (evaluation of outcomes)
3. information is personalised and presented in a clear way (facilitating conditions).

Furthermore, and in support of the ABC-model, McMakin et al. (2002) found that people are more likely to change their energy consuming behaviours permanently if the new behaviour is easy to perform, they have

the skills/resources required to change their behaviour, their neighbours and friends change their behaviours too, and people make public commitments to change their behaviours (McMakin et al., 2002). The ways in which energy consuming behaviours have been tested in previous research are discussed next.

6 Ways to change energy using behaviours - intervention measures

Academic research conducted on household energy consuming behaviours has focused on evaluating different types of intervention measures. Several previous studies have analysed behavioural research conducted on domestic energy consumption (see for example Abrahamse et al., 2005, Black et al., 1985, Claxton et al., 1983, Darby, 2006, De Young, 1993, Dwyer et al., 1993, Geller, 1981, Katzev, R. D. and Johnson, 1987, Roberts and Baker, 2003). In the UK context, there have been very few actual intervention studies conducted (see study by Brandon and Lewis, 1999), while countries such as the US have a longer history with intervention studies - these were particularly popular after the 1970s oil crises (see for example Becker, L. J., 1978, Becker, L. J. et al., 1981, Bittle et al., 1979, Bittle et al., 1979-1980, Black et al., 1985, Geller, 1981, Gonzales et al., 1988, Hayes and Cone, 1977, 1981, Heberlein and Warriner, 1983, Hirst and Grady, 1982–1983, Hutton et al., 1986, Hutton and McNeill, 1981, Katzev, R. et al., 1980–1981, Katzev, Richard D. and Johnson, 1983)

The small amount of intervention studies carried out in the UK so far can partly be explained by the fact that historically the UK has had substantial domestic coal, oil and gas reserves, and there was not a large energy conservation or efficiency push from the Government until the 1990s. With today's reality of dwindling domestic energy supplies and the impact of fossil fuel use on climate change, however, policy makers are realising that energy efficiency is not only relevant but increasingly important part of the UK's energy policy (DTI, 2007).

6.1 From information to feedback

Many of the intervention studies conducted in the 1970s and 1980s compared the effects of only one intervention measure or used a selection of various different measures (Dwyer et al., 1993), making it difficult to draw conclusions on which measure or a combination of measures would be the most effective in producing actual energy savings. In addition, some of the earlier studies lack methodological strength – including limited potential for future repetition, small sample sizes and lack the use of control groups (Bittle et al., 1979, Hayes and Cone, 1977, 1981). Furthermore, as most of the studies were conducted in the US, they are not necessarily comparable to other countries' such as the UK's conditions. The US has a widespread use of domestic air-conditioning and electric heating, which is not typical to the UK. However, this previous research gives insights into the types of intervention measures that have been tested in relation to households' energy consuming behaviours. These can be divided into three categories:

Table 2: Various intervention measures (see Abrahamse et al., 2005, De Young, 1993, Katzev, R. D. and Johnson, 1987, pg. 7)

Intervention measure category	Examples
Antecedent measures	• Information materials (information workshops, energy audits, energy saving campaigns) • Use of modelling
Consequence measures	• Feedback measures • Rewards and incentives
Social influences	• Use of groups • Use of commitment techniques

Many of the earlier studies looked at the effect of information and advice on energy consumption. Information techniques are based on the notion that once people understand the nature of the problem and receive information on how to change their behaviour, they are likely to change their behaviour. However, information alone is not enough to make people change their energy consumption behaviours and even similar information campaigns can have very different results (Abrahamse et al., 2005). Furthermore, information and advice are only useful as long as the recipient of the advice trusts the information source.

Previous research suggests that the most effective intervention measures so far have been consequence measures, feedback in particular. Feedback on energy consumption can take several forms and measures include techniques such as giving respondents either daily, weekly or monthly feedback on their energy consumption and using methods such as postcard prompts, comparative monthly bills, or technologies such as direct displays or smart meters (see for example Abrahamse et al., 2005, Darby, 2006). The underlying theory behind feedback is that once people receive information on their energy behaviours, they are likely to form attitudes on those behaviours and act accordingly. Continuous feedback can also make people aware of their routine behaviours. See Table 3 for various feedback measures available regarding domestic energy consumption.

Table 3: Various types of feedback (Darby, 2006, pg. 8)

Type of feedback	Example
Direct feedback available on demand	• Self-meter reading • Direct displays • Interactive feedback via a PC • Pay-as-you-go meters • Ambient devices • Meter reading as part of energy advice • Cost plugs on appliances
Indirect feedback data processed by utility and sent to the customer	• More frequent bills • More frequent bills based on either comparative, historical, or disaggregated feedback, or annual/quarterly reports
Inadvertent feedback Learning by association	• Microgeneration • Community projects
Utility controlled feedback Learning about the customer	• Smart meters

Research suggests that direct feedback (immediate either from a meter or a display monitor) has generally resulted in 5-15% energy savings, while indirect feedback (via a bill or processed in other ways) has normally seen savings of 0-10% (Darby, 2006). Previous research has also suggested that continuous feedback on energy use and costs has proven useful as it deals with current behaviour rather than past behaviour (Dwyer et al., 1993). Some earlier studies suggest that feedback can reduce electricity consumption by 10-20% (Katzev, R. et al., 1980–1981), however, there is still relatively little evidence on which feedback measure or a combination of measures are the most effective. That is particularly the case in the UK context as there have been little feedback studies conducted in this country.

The way feedback is presented needs careful consideration, whether for example the cost of electricity is presented in a daily or cumulative way, particularly if daily costs are relatively low in comparison to other living costs (Bittle et al., 1979). Furthermore, whether feedback is presented in monetary terms or in kilowatt hours can have an influence, for instance energy prices are influenced by several factors and can change considerably without necessarily directly reflecting households' energy consuming behaviours (Hayes and Cone, 1981). In a study which looked at the attitudes of 207 couples to their winter energy use in the US, Becker et al. (1981) found that people's comfort was more important than monetary savings from energy conservation measures. Results from this study suggest that feedback which has a theme on saving energy and saving money needs to also incorporate the message that it is possible to save energy and money while maintaining comfort.

Furthermore, there is also a difference between how much weight people put on the various benefits resulting from energy saving behaviours, whether for instance these are monetary or environmental benefits. In a six-year study conducted in Canada during 1973-1978 which measured the links between 136 households' electricity use and attitudes Heslop et al. (1981) found that price consciousness had a greater influence on energy consumption than environmental or social responsibility attitudes. Following the ABC-model of behaviour, this has been shown repeatedly in other industries and for instance in a study analysing people's car use Gärling et al. (2002) found that if people had to make changes to their behaviour which was costly in one way or another (resulting in monetary or psychological costs, or other inconveniences), they would actively look for alternatives with smaller costs.

The level of households' previous energy consumption can also have an influence on the effect of feedback. Research conducted in the UK on 120 households over 9 months found that high and medium users are likely to reduce energy use with feedback while low users are likely to increase it (Brandon and Lewis, 1999); hence the different types of energy consuming groups have to be taken into consideration when designing the type of feedback they will receive.

Furthermore, longevity of behavioural change from feedback needs to be taken into consideration, so that once the feedback is removed households do not reverse back to their old behaviours. Research has also found that feedback presented by a computer is more likely to be used, accepted and trusted than feedback given by a person (McCalley and Midden, 2002).

perspect

6.1.1 Feedback via smart meters and display units

Technological innovation has allowed the introduction of smart meters as a way of measuring energy consumption in the home and also allowing more specific feedback to be given to the householder. Smart meters utilise technologies such as smart cards and two-way metering (Darby, 2006), and they can be combined with devices such as direct display units, the use of TVs and PCs, and ambient displays which can provide current and historical consumption data to the householder. Furthermore, smart meters allow energy suppliers to collect automated meter readings (as part of some smart metering systems), which can then be fed back to the household (Darby, 2006). Automated meter reading reduces the requirement for manual meter readings and reduces account enquiries related to estimated meter readings, which are often the most common customer complaints. They also allow utilities to innovate new tariffs and work well with other new technologies such as microgeneration (see also Figure 5).

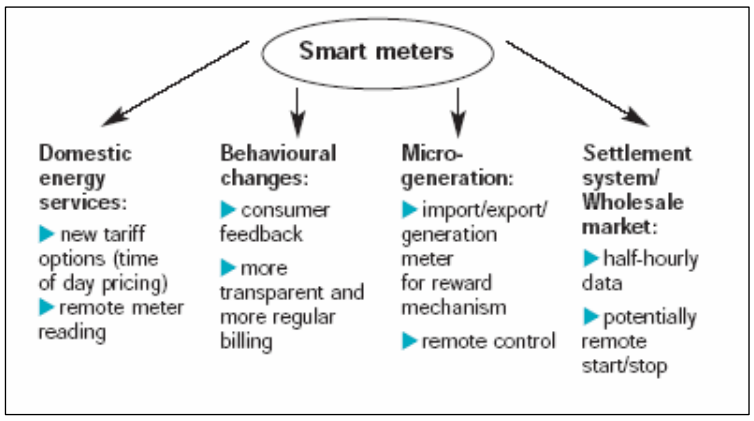

Figure 5: The potential impact of smart metering (Watson et al., 2006)

Smart meters can act as potential tools for behavioural change as they allow households' to become more aware of their energy consumption, provide continuous feedback which can be tailored to each households individual requirements. Studies conducted in the US and Norway on smart meter systems suggest that households who receive feedback on their energy consumption, saved an average of 10%-15% (Darby, 2006). These types of technological developments are also now being considered in the UK, with energy utilities and the Government testing out new technologies.

6.2 UK's energy efficiency policy and behavioural change measures

The UK Government has set a target to reduce carbon dioxide emissions by 60% by 2050 (DTI, 2007), and in 2007, the Government also published its Climate Change Bill which outlines a framework for the UK to achieve its emissions reduction targets. The key energy efficiency policy instrument

in the UK is the Carbon Emissions Reduction Target (CERT) (previously called the Energy Efficiency Commitment (EEC)), which requires energy supply companies to undertake energy efficiency measures in the household sector including measures such as energy efficient lighting, loft and wall insulation. EEC and the latest phase CERT run in three-year phases (2002-2005, 2005-2008, and 2008-2011). This policy instrument also has a strong social policy focus, with 40% of the measures taking place in households who live in fuel poverty (i.e. have to spend more than 10% of their income on heating bills). There are around 1.5 million households in England alone living in fuel poverty (Defra, 2007). The CO_2 reduction target for CERT will be overall lifetime carbon dioxide savings of 154 million tonnes of CO_2 delivering annual net savings of 4.2 million tonnes of CO_2 at the end of the programme (Defra, 2007). This is approximately double the targets under the second phase of EEC (2005-08), which is estimated to save about 1.8 million tonnes of CO_2 per year (Defra, 2007).

6.2.1 Potential to integrate feedback measures in the UK

The next phase of CERT for the first time is likely to include behavioural change measures such as various forms of feedback. The UK Government has indicated that smart meters, display units and microgeneration technologies could count towards energy efficiency savings under CERT (Defra, 2007). Early indications from countries which have rolled out smart meter technologies, such as Italy, Canada and Sweden, suggest that these technologies have improved demand side management by providing customers with accurate bills, hence reducing the amount of meter reads, as well as moving demand from peak to off-peak times (Ofgem, 2006).

The UK is still in relatively early stages of utilising smart feedback measures such as smart meters, display units and more innovative billing. However, in 2007 the Government announced 2-year long trials testing various smart meter technologies and their potential impacts on households behaviour (DTI, 2007). Furthermore, the Government has announced that clip-on display units are available with any new meters and to any household who requests them between 2008-2010 (DTI, 2007). This move is partly pushed by the European End-use Efficiency and Energy Services Directive, Article 13 of which states that smart meters should be used when an existing meter is replaced, as long as it is technically feasible and cost-effective, and they should always be installed in new buildings or in major refurbishments (European Commission, 2006).

The UK Government estimates that its short-term measures of providing display units will deliver savings of 300,000 tones of CO_2 emissions per year by 2020 (DTI, 2007), which is still a relatively small amount of the total CERT target. The timeline for smart meters to be rolled out at a national scale in the UK is within the next ten years (DTI, 2007). However, this timeline does seem fairly long in the face of climate change and the need to curb emissions from the household sector. Partly the delay can be explained by the lack of evidence on which behavioural change measures would prove to be the most effective in the UK context, but partly also by the fact that the UK's metering market is liberalised and directed by competition. Furthermore, it could be argued that the UK has been slow in comparison to

other countries to deploy various feedback measures such as better bills, and previous has argued that these should have been introduced much earlier than the Government now intends (Roberts and Baker, 2003). However, it is encouraging that the Government is committed to a long-term experimental research in this area, particularly since there have been few long-term energy intervention studies conducted worldwide (Abrahamse et al., 2005), and even more so in the case of the UK.

The following research questions remain relevant in relation to possible intervention measures being deployed in the UK:

1. What combination of intervention measures is likely to be the most effective?
2. How should individual intervention measures be designed to ensure maximum impact, for example:
    a. Where should display units be located?
    b. How should consumption information be presented (e.g. numbers, graphs)?
3. How to ensure that intervention measures provide long-term behavioural changes?

Many of these questions are expected to be answered through the Government's trial of smart meters and display units, though further research in this area is likely to be required.

7 Conclusion, lessons learnt and the way forward

In order to achieve its CO_2 emissions reduction targets, the UK needs to reduce emissions from the household sector. Partly the UK's old and inefficient housing stock is responsible for households' large share of emissions (27% of UK total), but people's behaviour in their home is another influencing factor. Energy consuming behaviours, such as cooking, using appliances and changing the thermostat level, are influenced by three key areas, which can be summarised:

1. Internal factors: personal values, attitudes, beliefs
2. External factors: regulations, institutions, cultural settings
3. Habits and routines

In order to change people's behaviour, all of the above factors need to be considered - internal, external and habitual. Our behaviours are not simple but based on various components, of which habits and routines form the most challenging and complex part. Even though a person's attitude may be positive towards certain pro-environmental behaviours and the person may have an intention of undertaking that behaviour, his or her habits can get in the way and prevent that behaviour from happening, or the person may act opposite to his or her intention without even realising it (e.g. I will turn my television off at the end of the day as it saves electricity, but in the evening my habit of leaving it on standby takes over without me realising it and I wake up in the morning with the television on standby - again).

Changing energy consuming behaviours can be complicated and can require a combination of measures. One of the challenges regarding energy consuming behaviours and selecting the right type of intervention measure/s, is that there is not yet enough evidence to clearly say which types of measures lead to behavioural changes and provide the largest and long-term energy savings. There is also some disparity amongst the research available in intervention studies, with many of the previous studies lacking in methodological strength. Therefore more robust research is required in order to establish which types of intervention measures or a combination measures would be the most effective in changing energy consuming behaviours and resulting in quantifiable long-term behavioural changes and energy savings. More research is required in particular in the UK context, where little experimental studies have been conducted on households' energy consumption.

However, some conclusions of behavioural change can be drawn from existing intervention research in other countries such as the US. Even though some of the evidence may not be fully reliable or representative of current UK circumstances, it indicates that behaviour can and does change. Good examples of this include for instance direct or indirect feedback. Direct feedback interventions (using a smart meter and displaying feedback via a display unit or a monitor) can result in an average of 5-15% energy savings, while indirect feedback (via a bill or processed in other way) has normally seen savings of 0-10%.

There is little evidence yet of which types of feedback measures would provide the most energy savings in the UK context. The challenge for policy makers and utilities in the UK remains over which intervention measures will provide long-term behavioural changes. A combination of smart meters and display units and more innovative billing for example could provide households with better feedback on their energy consumption, raise awareness of households' energy consumption, possibly form new habits and thus create potential for behavioural change.

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Business-ecodesign,labelling,PSS (1)

Chapter 5 Supporting sustainable regional innovation and ecodesign in small to medium enterprises

a discussion on the issue with insights from Wales

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1 Introduction

The paper aims at providing empirically-based insights into perceptions of ecodesign and sustainable development amongst design-led small to medium enterprises (SMEs) in Wales. The purpose is to inform methodological frameworks for ecodesign and sustainable innovation capacity building activities with SMEs. The investigation will include a characterisation of design-led growth businesses from a selection of manufacturing and service sectors, undertaking product development projects when environmental and social performance requirements could be considered.

The research was carried out in two phases. The initial phase involved a self-completion questionnaire which identified and ranked 250 businesses in terms of their growth potential and propensity to benefit from ecodesign. In the second phase of research over 30 companies, including key companies identified from Phase 1, were selected to attend three concurrent facilitated workshops where SME attitudes to environmental and social issues were explored.

The study shows that within design-led SMEs in Wales there is a concern at a managerial and operational level for sustainability issues in product and service development. The paper reflects upon the process, managerial and system barriers that prevent many of these SMEs from implementing ecodesign and sustainable innovation. The research identifies key action areas for intervention and highlights the need to reposition intervention strategies depending on institutional, organisational and operational capabilities.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium. Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

2 Context

Sustainable Consumption and Production (SCP) requires radically new perspectives on reducing the life cycle impacts of the production, distribution and consumption of products and services. The SCP agenda engages strongly with new perspectives on sustainable development policy, new understandings of innovation and new realities of business and communication.

Because the majority of the private sector is made up of SMEs it will be crucial to engage these businesses in SCP. It is increasingly understood that the cumulative environmental impact of SMEs is large, with some estimates suggesting that SMEs are responsible for as much as to 70% of industrial pollution (DG ENTR, 2004). In a recent study in the UK, only 15% of SMEs considered that their business activities could have an impact on the environment (NETREGS, 2007). This percentage rose significantly when the businesses were prompted on the potential environmental impact of specific activities. This low-awareness is coupled with weak market and policy incentives for improving environmental performance. The transitioning to more sustainable business models is also hindered by complex policy programmes, larger institutional bias, strategic, technical and financial weaknesses in SMEs and the perceived poor appropriability of investment in sustainable innovation.

As part of the Welsh Assembly Government's commitment to sustainable development (SD)[1], funding was provided through the Materials Action Programme (MAP)[2], to establish Ecodesign Centre Wales (EDC). EDC focuses on building capacity and capabilities in industry, public sector organisations and HE so that effective ecodesign can happen in Wales.

It is important to note that the perspectives within this paper reflect those of intermediary organisations working directly with businesses. Intervention strategies relating to central government are not discussed in detail.

3 Background issues impacting ecodesign in SMEs

3.1 Ecodesign, SCP and SMEs

For the purpose of clarity, we define ecodesign as a strategic design management process that is concerned with minimising full life-cycle impacts of products and services (e.g. energy, materials, distribution, packaging and end-of-life treatment). EDC see ecodesign is good design so this approach is relevant to mainstream design activities.

Although it is primarily focused on product and process improvements, ecodesign can act as a bridging link between the supply and demand sides of the SCP agenda. It can drive eco-efficiency improvements on the supply-side while enhancing sustainable consumption through effective design and business communications. There are numerous indirect or 'public good' benefits from ecodesign through positive externalities, such as low carbon products and services and improved environmental awareness.

1 Wales has a statutory obligation, built into Section 121 of the government of Wales Act 1998, to promote Sustainable Development in the exercise of its functions.

2 MAP funds are derived from the landfill tax scheme for businesses.

Ecodesign can be systematic, interactive and dependant on internal and external stakeholders. Therefore SMEs require new organisational and managerial capacities and face significant barriers when implementing ecodesign. From experience, through working with SMEs, and prior research (Millward and Lewis, 2005; OECD, 2005; Rennings et al., 2003; Tukker et al., 2000) the primary barriers can be classified on three levels (Table 1).

Table 1: SME barriers to ecodesign

Level	Barrier
managerial	• lack of managerial and operational resources (including time, cost, skills)
	• failure of SME managers to act strategically
	• lack of top management commitment.
	• lack of awareness, training, and motivation of employees
organisational	• systematic, interactive and strategic nature of ecodesign
	• fragmented product development processes in SMEs
system	• competing policy rationales (e.g. environment and innovation)
	• government information asymmetries (related to interventions)
	• uncertainty and poor appropriability of sustainable innovation
	• "public-good" nature of investment in ecodesign

3.2 Innovation and SCP

Innovation (product, process, institutional and system) is a pervasive issue in policy making and is integral to the SCP debate. Much of the discussion and debate on innovation in the SCP context focuses on the role of radical and systems innovation, such as innovation in energy or mobility systems. While much of this debate is essential, the cumulative impact of incremental innovations on long term economic development and social change can be equal or greater than radical innovations (DG ENTR, 2002; Fagerberg, 2004; Kemp et al., 2004; Stabaek, 2006).

The development of coherent policy frameworks for innovation and SCP is often hindered by competing policy rationales, short-termism in resource allocation and fragmentation and segmentation of policy domains (OECD, 2005). For example policy strategies for innovation often contradict and discount strategies for the environment.

Innovation, both radical and incremental, is an interactive process where a company relies on information from and communication with different sources. These sources include market, suppliers, R&D institutions and networks. Experience has shown that there is great variance in how SMEs commercialise this information and knowledge. This is due to a number of factors including;

- Organisational capacity (especially in the case of start-ups)
- Internal communication and information systems
- Managerial culture
- Knowledge management systems
- Monitoring and evaluation systems
- Internal capacity to exploit external resources

3.3 Encouraging regional innovation and ecodesign

Although innovation policy is primarily concerned with stimulating regional and national competitiveness, it is increasingly concerned with

improving the environmental and social performance of the economy (EC, 2004). Many public sector initiatives that are not explicitly branded innovation policies are important for encouraging the diffusion of innovation. National and regional innovation systems are constantly changing in terms of their actors, policy instruments and challenges addressed.

There are many hard and soft mechanisms, outlined in Table 2, for encouraging regional innovation (Cooke, 2007; EC, 2006; Kivimaa, 2006; Morten Gabr, 2006).

Table 2: drivers and mechanisms for innovation

Driver	Mechanisms (hard and soft)
finance	
private & public sources for all company size,	tax law
development stage and sector	state aid
	structural funds
knowledge	
technology awareness	research funds
market intelligence	IPR system
management capacity	knowledge and technology transfer
design capacity	networks and clusters
human capital	
skills	education
creativity	labour law
entrepreneurialism	immigration
mobility	clusters
flexibility	
demand	
EU & global markets	market
consumers,	regulations
industry	procurement
public sector	

There have been numerous public sector interventions and initiatives to support ecodesign activities in SMEs. The majority of such initiatives ran throughout the mid-late 1990's and were primarily concentrated in Germany, the Netherlands and Scandinavia. Recently other European countries such as Ireland have begun to address the implementation of ecodesign in SMEs. While the initiatives took many forms (O'Connor and O'Rafferty, 2005; Tukker et al., 2000), the primary mechanisms of intervention included;

- information services
- demonstration projects
- R&D financing
- grants
- establishing co-ordination bodies
- 'brokering' services

It is understood that many publicly funded initiatives on innovation and environmental best practice in SMEs do not produce long-term impacts in the SMEs or sectors involved. The reasons for this include limited project scope, restrictive budget cycles, fragmented support mechanisms and lack of consideration of broader institutional contexts. It is also true to say that impacts and outcomes of these initiatives are difficult to measure. More often than not the success of an intervention is only based on narrow

quantitative measures and output additionality. Other difficulties in measurement include attribution of intervention to additionality and spill-over effects, time-lag between commercialisation and intervention, the quantification of qualitative effects, improved absorptive capacity, competencies of SMEs and improved networks (Boekholt and Larosse, 2002).

4 Methodology

The research was carried out in two phases and occurred during the development stages of Ecodesign Centre Wales.

The initial phase involved a self-completion questionnaire which, from a sample of 2056 SMEs, identified and ranked 250 businesses in terms of their business growth potential and attitudes to environmental issues. Each of the businesses selected has a self-specifying design capacity. These companies predominantly operate in the following sectors: electronic and electrical equipment, general manufacturing, food and drink, automotive and building. Half of the highest ranked companies employ between 10 and 49 staff.

Ecodesign Centre Wales worked in partnership with the Leadership, Enterprise and Economic Development Unit (LEED) of Cardiff Business School to design and develop the questionnaire. The LEED Unit have developed an informal index, the potential growth index (PGI), that aggregates the responses of firms using a combination of quantitative and qualitative data.

The next phase of the research involved three concurrent facilitated workshops with over 30 SMEs. These workshops ran during an industry event and involved businesses identified through the growth study alongside other design-led businesses from Wales, recycling companies, policy makers and knowledge transfer practitioners.

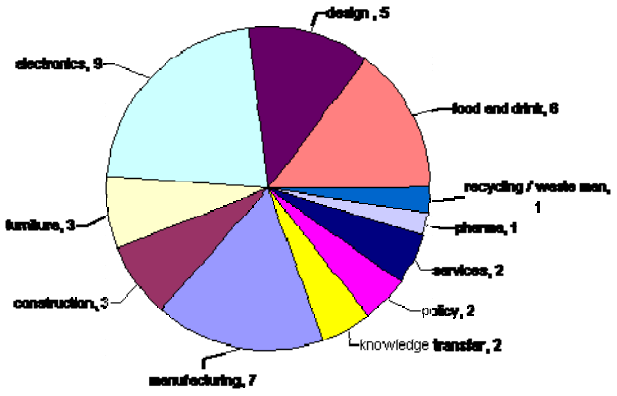

Figure 1: Breakdown of workshop companies by sector

5 Overview of findings

5.1 Phase 1 of the research

Through Phase 1 of the research, some key operational and managerial indicators of business growth that are relevant to ecodesign and innovation

were identified. These indicators have contributed to a characterisation of design-led growth businesses. These primary indicators included;

- Self-specifying design capacity
- Turnover and profitability
- Export potential
- Management prioritisation of environmental issues
- Business obstacles/barriers
- Innovative capacity
- Networking
- Environmental management capacity
- Skills development and training
- Investment in new products and processes
- Investment in research and development

In terms of design activities, about three-quarters of respondents [3] indicated that they use an in-house design department, over one-third use external design consultants and 6% indicated that they use 'other' sources to conduct design, e.g. Knowledge Transfer Partnerships[4].

Three quarters of respondents have a business plan, and just over half have marketing and training plans. 20% of respondents reported that they have other strategic documents including a vision document, cost reduction plan, investors in people and quality assurance documents.

5.1.1 Management prioritisation of environmental issues

In terms of short to medium term business priorities, better targeting of customers, developing staff and increasing innovation are the most important. Other priorities cited include developing social responsibility and improving environmental performance. 38% of respondents considered improving the environmental performance as a main source of competitive advantage.

While 14% consider environmental performance as a very high priority for their business, just over a quarter do not consider it to be a priority. 22% and 27% of respondents respectively are looking to grow their business through improving the environmental performance of their company and developing social responsibility. 37% of respondents suggest they are accredited with one or a combination of the ISO14001, EMAS, and Green Dragon[5] environmental standards.

5.1.2 Business obstacles and barriers

The majority of those businesses surveyed showed ambitions to growing their business with increases in turnover, profitability and staff being cited by at least three quarters of respondents. When it comes to how they plan to do this approximately 60% plan to expand their premises, increase their product range and move into new markets.

3 The survey was completed by a senior representative from the company i.e. owner, director or financial director. The engagement from the outset of senior management was a key criterion for inclusion in the study.

4 Knowledge Transfer Partnerships (KTP) is Europe's leading programme helping businesses to improve their competitiveness and productivity through the better use of knowledge, technology and skills that reside within the UK knowledge base. See http://www.ktponline.org.uk/

5 Green Dragon is a Welsh five-stage environmental management system relevant to the specific needs of SMEs. Participating organisations gain recognition for effective environmental management without necessarily adopting a formal management system. http://www.greendragonems.com/

Surprisingly, respondents on average did not perceive any major obstacles to the growth of their business. This may relate to the perspective taken that SMEs in general do not have strategic capacity. The largest priority related to the training and recruiting of good staff. This would correlate with the intention to grow their business.

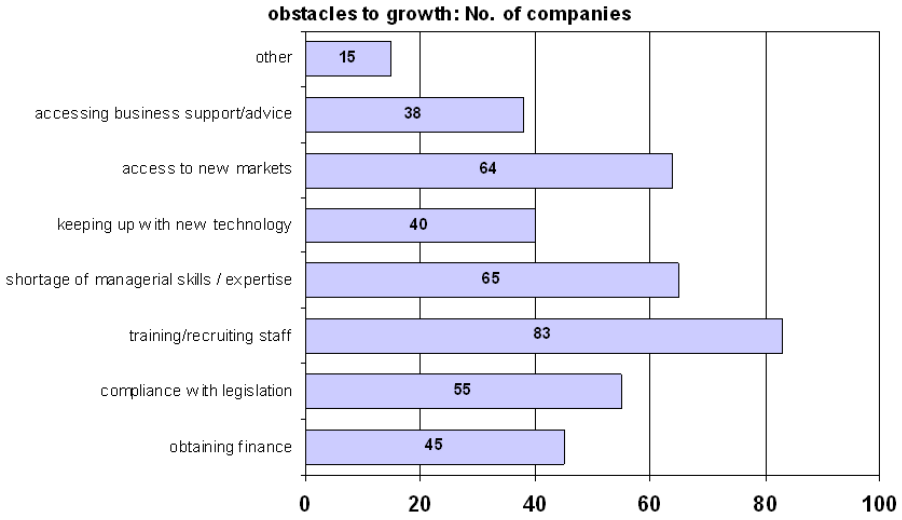

Figure 2: What would you say are the main obstacles to the growth of your business? (LEED, 2007)

5.1.3 Innovative capacity

Innovation was highly valued to companies that predicted rapid growth. The companies that value innovation seem to be more ambitious and had performed better in recent years. The companies that considered themselves innovative in relation to their industry sector had also been more active in implementing change through the introduction of new and/or improved processes within the last 12 months. Respondents identified a number of constraints to innovation including a lack of tax incentives, finance and skilled personnel.

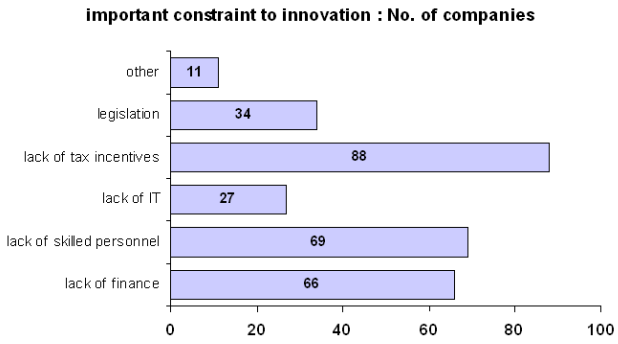

Figure 3: What are the main constraints on innovation? (LEED, 2007)

5.1.4 Networking

Over half of respondents consider networking to be important for the success of their company. 55% of respondents are members of a trade association, over one quarter are members of a business club, and 12% belong to a supplier association. The benefits obtained from networking included improved skills and training, accessing new markets and environmental compliance.

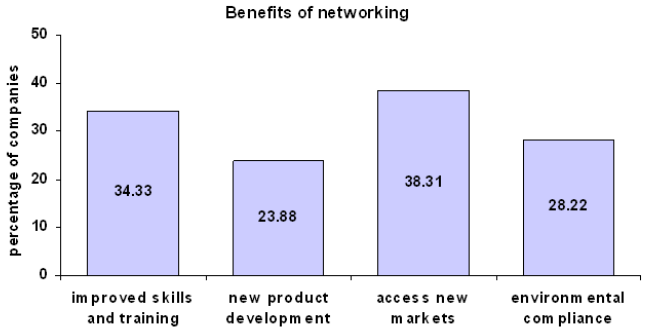

Figure 4: What are the benefits of networking? (LEED, 2007)

5.1.5 Skills Development

Of those surveyed, larger companies value training far more than smaller ones. These results are borne out in practice as well as attitudes. Those companies with more employees tended to invest in training and have a set training budget. It is important to note that training in the smaller and micro-sized businesses tends to be ad-hoc and more informal. It is important to consider how SMEs value training that is either context specific or accredited. There is a conflict in how service providers can tailor training programmes to specific needs while maintaining reliable and certifiable training. The systems of learning within SMEs have an important bearing on how strategies for external support are developed.

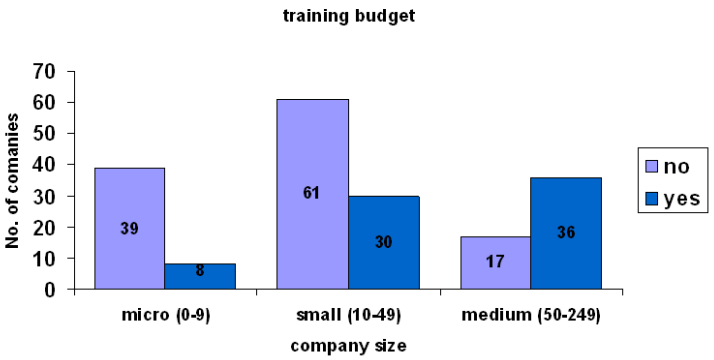

Figure 5: do you have a training budget? (LEED 2007)

5.2 Phase 2 of the research

Through the second phase of the research it was possible to explore in more detail some of the existing perceptions on ecodesign and sustainable business practices in Welsh SMEs. In general the perceptions were positive and reflect much of what has been previously discussed in the literature on ecodesign.

It is important to highlight that the company perception may have been influenced by the event and the facilitation of the workshops by EDC staff.

5.2.1 Perceptions of ecodesign

During the workshop the attendees were initially asked to discuss the potential benefits that ecodesign and social responsibility could bring to their business. Many of the responses were broad and largely general but they can be classified under three headings (Table 3).

Table 3: benefits of ecodesign as identified by companies

Level	Benefit
strategic	**innovation**
	• new product/service ideas
	• new ways of looking at existing products/services
	• long term gains arising from short term investments
internal	**costs**
	• reduced production cost – e.g. bill of materials, energy bills, more efficient distribution
	• compliance costs – e.g. landfill tax
	• end-of-life treatment costs
	communications
	• better supplier/customer communications
	• improved brand perception
	• product differentiation
	• enhanced brand equity
	commercial
	• “added value”
	• increased sales
	• compliance
	• associated quality indicators
	social
	• motivated staff
	• healthy environmentally aware staff
external	**resource efficiency**
	• waste minimisation / avoidance
	• on-site recycling
	• reduced packaging
	• transit packaging (in/out) and point of sale
	• potential for material re-use

5.2.2 Competencies for ecodesign implementation

After the companies discussed the potential benefits ecodesign could bring to their businesses they were asked to identify the primary competencies and support required to allow them to implement ecodesign. Again the discussions ranged broadly depending on the sector, scale and previous experiences of the companies in question (Table 4).

Table 4: required competencies as identified by businesses

Internal competencies	External competencies
• environmental impact measurement – e.g.. LCA, carbon/eco footprint, energy accounting tools • upskilled staff • environmental management systems • materials knowledge • energy, packaging auditing • supplier communications • understanding of design trade-offs – e.g. product durability /longevity • understanding cost implications • improved planning - reducing business risk – e.g. investment	• more/better information from public sector organisations • ecodesign support through existing business support organisations o – e.g. trade bodies o Intermediaries o Funding bodies • ecodesign support through existing business networks • improved graduate skills/training

6 Developing interventions for SMEs

Key success factors of previous capacity building and demonstration initiatives included top management commitment and integration with existing management systems, a clear business case communicated to companies, appointed environmental champions (within SMEs), involvement of wider design community, inter-agency and business support service endorsement and a project team with the right skills and commitment (O'Connor and O'Rafferty, 2005).

From our analysis of the two phases of research we can see that several additional intervention implications emerge. There is a clear need to for intermediary organisations to;

- diagnose
  - existing awareness of sustainability and competencies for ecodesign in companies
  - level of training and skills development required on ecodesign tools and strategies
- establish appropriate KPIs using hard and soft metrics
- improve access to and composition of finance
- provide practical support on compliance

These factors can be used to inform strategies and key action areas on intervention for ecodesign in SMEs (Table 5). These activities should drive processes of network and skills development through shared learning. It is also important to create the platforms on which this shared learning can occur.

Table 5: key action areas for intervention

Activity	Actions
identify focus areas for intervention	• in a region, identify external stakeholders include design consultancies, business support organisations, research agencies, financiers (public and private), business networks, other SMEs and suppliers. • evaluate role, competencies and input relevancy to product development in SMEs
market analysis	• identify businesses that are likely to succeed and benefit from intervention. • identify products and services with large environmental impact • identify products and services that will provide transferable knowledge
build capacity in	• build capacity in existing business support organisations

Activity	Actions
business support organisations	• create platforms for communication and collaboration
embed in education	• embed sustainability and ecodesign in mainstream design education. Many SMEs require graduate to be proficient designers while managing broader issues such as legislation
create platforms for networking	• commercial mentors • help SMEs share experience and knowledge
build capacity in the design sector	• build capacities in design sector. Many SMEs do not have internal design capacity. Design consultancies require skills, knowledge, resources and capacity for ecodesign
establish policy learning processes	• monitoring and evaluation of activities to establish an evidence base (using hard and soft metrics)

7 Conclusion and discussion

This paper provides empirically based insights into perceptions of ecodesign and sustainable development amongst design-led SMEs in Wales. These insights will be used to inform methodological frameworks for ecodesign and sustainable innovation capacity building activities.

Crucially the investigation highlighted that within design-led SMEs in Wales there is a concern at a managerial and operational level for sustainability issues in product and service development. Through reflecting upon the barriers that prevent many of these SMEs from implementing ecodesign and sustainable innovation this paper identifies key action areas for intervention.

Experience and prior research (DEFRA, 2006; Andersen, 2004) has shown that a number of key factors can greatly influence when and how SMEs engage with intermediary organisations. These include:

- **Local knowledge of business support organisations**: SMEs respond positively to support organisations that have local knowledge, including other business support organisations, suppliers, sector organisations and competitors.
- **Partnerships:** Ecodesign in SMEs requires a team approach and this is fundamental for engagement. Partnership development is essential and can be facilitated through supply-chain initiatives, commercial mentoring programmes and informal business networks.
- **Long-term relationships:** SMEs benefit from established relationships with intermediary organisations and business support organisations. It can take time to establish rapport and trust. This needs to be accounted for when developing intervention initiatives for SMEs.
- **Inspiration:** SMEs need to be inspired to engage with ecodesign and then facilitated to apply the various ecodesign tools, techniques and resources. The knowledge and skills need to be appropriate to the needs of SMEs.
- **Appropriate language:** It is widely understood that communication needs to be appropriate for small businesses. This includes using simple jargon-free messages and balancing ecodesign and sustainability in business terms.
- **Suitable finance:** Access to finance is a key factor in encouraging innovation, growth and entrepreneurship. There is a need to simplify and improve the accessing of finance by SMEs.

This paper highlighted the rationale, through seeking to understand the business perspective, for supporting ecodesign activities in SMEs. It has also highlighted the need to reposition intervention strategies depending on institutional, organisational and operational capabilities. Supporting incremental innovations such as ecodesign in SMEs can lead to longer-term regional innovative capacities for sustainable development.

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Chapter 6 User-centred Design Strategies for Sustainable Patterns of Consumption

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1 Introduction

To achieve global sustainability, fundamental shifts are required in the way societies produce and consume (United Nations, 2002). Sustainability rests on three pillars: Economic viability, environmental responsibility and social responsibility. The precondition for sustainable development is social and economic development within the carrying capacity of ecosystems.

Average consumption patterns in the industrialised world, as well as in the developing and least developed parts of the world, are not sustainable. The process of consumption comprises acquisition, use and disposal of products and services, and is shaped and influenced by a complex set of factors and circumstances. Formal United Nations statements (2007) announce that change is needed in household consumption patterns and the production patterns that serve them: In consumer behaviour, house construction and maintenance, appliance design, volume and type of goods and services consumed, vehicle design and use, public transportation infrastructure and systems, urban planning, waste management, recycling and electricity generation. Frequent warnings express the severity of the situation, but when it comes to change, little has been achieved. Curbing consumption requires concerted actions. Production side efforts must be coupled with efforts on the consumption side. Central actors are governments, inter-governmental and non-governmental organisations, businesses and consumers (Mont and Plepys, 2008).

How can industrial designers help facilitating a shift towards sustainable consumption patterns? Considering the severe problems the world is facing, the design community is not addressing them in the way it might (Angharad, 2006). Rooted in technical disciplines, academic research in ecodesign and design for sustainability has mostly emphasised supply side efforts like prevention of pollution, technicalities and end-of-life issues. There is relatively little focus on demand side and consumption aspects. At the same time, it is widely acknowledged that for many durable consumer products, the user phase accounts for the largest environmental impacts (Brezet and

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

van Hemel, 1997; Weger *et al.*, 2001; Stevels and Boekee, 2004; Abele *et al.*, 2005; Tan and McAloone, 2006). This is mainly due to energy consumption, but also the use of accessories, cleaning, maintenance, upgrading and repair. Original equipment manufacturers realising this equip products with energy efficient technology and reduced levels of standby energy consumption. What receives less attention, is the fact that how sustainable a product or system really is, depends on the way it is actually used (Jelsma and Knot, 2002; Lilley *et al.*, 2005; Rodríguez and Boks, 2005).

At the same time, design disciplines such as interaction design are equipped with methods for user-centred development, but not necessarily based on societal values or aims to contribute towards sustainability. However, social values constitute the ideological foundation of the design communities Nieusma (2004) gathers with the term 'appropriate design': Universal design, participatory design, ecological design, feminist design and socially responsible design.

The paper addresses the potential for cross-pollination between design for sustainability and user-centred design, and the topics that arise when aiming for design strategies that influence human behaviour to support more sustainable consumption patterns. Section two reports on a literature review on drivers and determinants for consumption and human behaviour. Section three explores possibilities for behavioural change. Section four addresses the potential for contribution to industrial design through the introduction of a framework for analysis.

2 Background: Consumption patterns and behaviour

Current consumption patterns are principal causes of environmental problems (Briceno and Stagl, 2006). Consumer behaviour is central to society's impact on the environment (Jackson, 2005). The spiral of consumption seems ever-increasing, and is sustained and accelerated by a complex range of factors and conditions. Many and conflicting interests are involved, there are even conflicting objectives among the aspects covered by the term 'sustainable consumption' (Mont and Plepys, 2008). Recent efforts (e.g. User Behaviour and Technology Development by Verbeek and Slob (Eds.), 2006) reflect the need to cross professional borders and apply multidisciplinary approaches, allowing for a more thorough understanding of the interaction between behaviour and technology potentially providing insights useful both for politicians and technology developers.

2.1 Views on consumption and behaviour from different actors and disciplines

Within economics, political science, sociology, anthropology and psychology there is a comprehensive and rather unmanageable range of literature on consumption and behaviour. The disciplines represent different perspectives on consumption patterns and the mechanisms and driving forces shaping them, from a societal view via household perspectives to the level of individuals. Economic, historic and socio-technological and socio-psychological explanations describe three groups of factors that drive and shape consumption and our willingness to consume (Røpke, 1999).

2.1.1 Economic macro-level explanations

Economic studies explain how economic forces shape and influence consumption on national, regional and company levels (Mont and Plepys, 2008). Conventional economics suggest that increased levels of economic consumption equal increased levels of welfare or well-being (Jackson and Marks, 1999). This has to some extent limited policy to change consumption patterns (Briceno and Stagl, 2006), together with the fear of interfering with consumer sovereignty principles (Jackson, 2005) and perceptions of reduced consumption as threatening to economic growth, technological innovation and international competitiveness (Mont and Plepys, 2008). Neoclassical assumptions about utility maximisation have dominated mainstream economy, suggesting that consumers behave rationally by systematically reviewing their choices and acting in own economic self-interest in response to price (McKenzie-Mohr, 2000; Mont and Plepys, 2008). Increased consumption is what people prefer and demand (Røpke, 1999). Economy translates needs into desires, preferences and demands, and sees satisfaction as best safeguarded by mechanisms of consumer choice in open markets (Jackson and Marks, 1999). A country's economic performance is usually measured through macroeconomic indicators such as gross national product (GNP). Economic growth is normally considered beneficial, and is the key objective of most governments. A dropping GNP means businesses go bankrupt, employees are fired, personal savings are reduced, the public sector borrows and trade deficits rise (Jackson and Marks, 1999). Hence, providing people with increased personal disposable incomes becomes a logical social objective (Jackson and Marks, 1999). Politicians' unwillingness to interfere with individual consumption hands responsibility over to the individuals, shifting attention away from businesses and governments' role in maintaining unsustainable consumption patterns (Gardner and Assadourian, 2004). Established critiques question the correlation between national economic performance and individual well-being (Jackson and Marks, 1999). Environmental concerns were added more recently.

While economical perceptions may be too simplified and apologetic, critics often underrate the importance of consumption (Røpke, 1999). Psychological and sociological influence has given a growing consensus that consumer behaviour is far more complex (Mont and Plepys, 2008): Much consumption has wrongly been characterised as needs fulfilment, utility maximisation and reasoned choice (Belk et al., 2003). We may not be happy with ever-increasing consumption, but are not just victims of producers forcing consumption upon us either (Røpke, 1999). The developed countries' inhabitants' willingness to alter consumption patterns is therefore questionable, and how to accomplish such a change is a complex matter.

Fundamental historical drivers for consumption growth have been labour division, urbanisation, industrialisation, competition, availability and use of cheap fossil fuels and transfer of resources to the North from the South (Røpke, 1999). All drivers are still active, and several more specific factors and circumstances contribute.

Productivity is persistent and increasing, and manufacturers compete on price or by innovating, positioning and differentiating goods and services in highly saturated markets. New products and improved versions are frequently introduced triggering replacement of old, still usable ones unable

to keep up with fashions and requirements, while technological change outdates older technologies (Røpke, 2001). Niches emerge and more specialised products and services become available (Jackson and Marks, 1999; Røpke, 1999). Omnipresent advertisement campaigns and seemingly convenient credit facilities attract buyers, facilitate and encourage spontaneous purchases and provoke the choice of consumption over more leisure time (Røpke, 1999). Working life's institutional setup fuels the work-and-spend culture with financial rewards, seniority-based salaries and full-time and overtime-based promotions (Røpke, 1999). Manufacturers do not compensate for environmental and social production costs, hence relative prices favour industrially manufactured products over non-industrial products and services, contributing to material consumption and individual ownership (Røpke, 1999). Consumerist design critics accuse market structures of favouring short-term profitability through short-lived, gimmicky and superfluous design, and of supporting caterers to the economically powerful while constraining opportunities for social visions in design (Nieusma, 2004).

2.1.2 Historic and socio-technical meso-level explanations

Sociology investigates how consumption practices arise and are affected by societal institutions like social culture, social class, family, ethnic and religious groups (Mont and Plepys, 2008).

Sustainable consumption is not just a matter of choice. The socio-technical framework of collective, socio-material systems limits our choices (Røpke, 1999). Such systems, including the sewage system, electricity and water supply, railways and roads and our interaction with them, for example through the layout of kitchens and bathrooms, constrain our consumption patterns and opportunities for acting in a sustainable way (Shove and Warde, 1998; Røpke, 1999). There is often no alternative to the systems but to do without their service. In planning, more attention should be paid to infrastructure, its constraints on people's options and decisions and the conventions, routines and habits shaping daily consumption of water and energy (Shove and Warde, 1998).

The paradoxical relation between the constant busyness of everyday life and the increased availability of labour-saving devices illustrates mechanisms of consumption growth linked to home-making, urban lifestyles, individual ownership and specialisation (Røpke, 1999). The introduction of cars, food processors and vacuum cleaners has not given a reduction in time spent on travelling or housework. Technological improvements cause increased consumption or higher quality (Røpke, 1999; 2001): Cars enable working farther away from home; vacuum cleaners facilitate frequent cleaning and escalating standards of cleanliness (Shove and Warde, 1998; Røpke, 1999).

Research should pay attention to social processes' influence on consumption (Briceno and Stagl, 2006): How technologies spread, become common and influence other consumption activities and how expectations and levels of comfort, convenience and well-being considered normal develop inconspicuously (Shove and Warde, 1998). Inter-dependent habits and practices related to background notions of comfort, convenience, security and normality should be distinguished from individualised

consumer behaviour and conscious selection of commodities (Shove and Warde, 1998).

2.1.3 Socio-psychological micro-level explanations

Individuals consume for functional and symbolic reasons: To satisfy needs, display identity, indicate social belonging, gather resources, differentiate socially or participate in social activities (Warde, 1996; Røpke, 1999; Jackson, 2005). Our choices of goods are influenced by functional, conditional, social, emotional and epistemic product values (Mont and Plepys, 2008). Anthropological explanations see goods as elements in rituals establishing meaning in the information system humans use to understand their social environment (Røpke, 1999). Psychology provides explanations to the processes and factors steering and influencing individual behaviour.

Consumption may be a means of achieving social status or distinguishing between social strata (Hofstetter *et al.*, 2006), a means of communication between individuals (Shove and Warde, 1998). Sociologist Bordieu (1995) explains how consumption, lifestyles and consumption patterns must be studied in relation to other lifestyles and consumption patterns: How we choose and relate to goods are symbolic differences constituting a language of distinguishing differentiating signs. The contrasts create meaning positioning us in the social space: To feel socially superior we compare and position ourselves relatively to others. Simultaneously, an intensified individualisation process dominates social change. Individuals are let loose from traditional social ties, and are not that bound by socio-economic circumstances, social roles and cultural norms of class, gender, place or religion (Røpke, 1999; 2001). Additionally, many direct social relationships are transformed into abstract, large-scale social structures integrating individuals into complex, global networks, e.g. providing access to goods from all over the world (Røpke, 1999). Another view on social comparison is thus that cultural pluralism has replaced the old hierarchical judgement system, and that people's social comparison is less envious and with others they identify with (Shove and Warde, 1998). Nevertheless, the struggle to acquire the same as or more than others creates a situation where continuously higher levels of reference push the whole society up to increasing levels of consumption growth (Briceno and Stagl, 2006).

Many social theorists uphold that consumption practices are linked to the sense of self and personality: People define themselves and their 'self-identity' by what they transmit through goods and practices (Shove and Warde, 1998; Røpke, 1999). This implies that consumption is central to psychological well-being, and a potential source of stress, anxiety and uncertainty (Shove and Warde, 1998; Røpke, 1999). Warde (1996) criticises studies of how individuals construct and maintain self-identity through deliberate manipulation and management of appearance and possessions for exaggerating and overestimating consumers' possibilities to control such processes. There is more to consumption than communication, and more to identity, especially the identification with societal groups, than commercial consumption (Warde, 1996).

The mentally stimulating character of novelty is a socio-psychological consumption-driver making anything that is different from what is seen before appealing, tempting consumers into exploring and experiencing it, at

times even replacing or discarding older products (Shove and Warde, 1998; Røpke, 2001). People rarely replace one consumption activity with only one new, more efficient activity (Hofstetter *et al.*, 2005). The idea that items should match may fuel the so-called Diderot effect (Shove and Warde, 1998): New acquisitions not matching old possessions may render the old ones unacceptable and trigger replacement. Dynamics of replacement and matching are however imaginable means of establishing more sustainable durability and simplicity-based consumption practices (Shove and Warde, 1998). There is such a thing as emotionally durable products: People avoid discarding products that are useful or trigger memories, nostalgia or good feelings in them.

The concept of domestication describes how households or institutions 'tame' new technology brought into their culture, and how technological and social changes mutually shape each other in a process of material and symbolic acceptance (Røpke, 2001; Frissen and van Lieshout, 2006). Others call it a process of 'coding' and 'decoding': Designers and marketers 'code' products culturally, consumers 'decode' them (Røpke, 2001). As scopes of designers and users may differ, the process involves interpretation and negotiation of application and cultural meaning (Røpke, 2001). It is influenced by the social structures, circumstances and cultural conceptions of households, and throughout its course, both the technologies and the social institutions are transformed (Røpke, 2001).

2.1.3.1 Needs and wants, satisfaction and quality of life

Studies of human needs have resulted in frameworks conceptualising how needs work. The perhaps most well-known is Maslow's hierarchical five-step pyramid of needs, ranging needs from basic physical ones at the bottom, to spiritual or transcendental ones at the top (Jackson and Marks, 1999). It is problematic as it suggests that fulfilment of needs happens in a sequential order, and that personal development depends on fulfilment of a certain level of material wealth: In contrast, much evidence documents people compromising basic needs to satisfy moral, psychological or spiritual ones (Jackson and Marks, 1999).

Max-Neef (1992) bases his framework for human needs on the nine fundamental needs subsistence, protection, affection, understanding, participation, creation, leisure, identity and freedom. They are interrelated and interactive, finite, few, classifiable and universal, and except for the essential need for subsistence – to stay alive, there is no hierarchy (Max-Neef, 1992). The framework also contains satisfiers – forms of the existential categories being, having, doing and interacting, which may contribute to actualisation of potentials expressed in the needs (Max-Neef, 1992). Satisfiers are context-relative and culturally determined, and there is no one-to-one correspondence between them and the needs. The needs can be satisfied at different levels, with different intensities: With regard to oneself, a social group or the environment. Not all attempts to satisfy needs are successful: Inadequately satisfied human needs reveal human poverties that generate pathologies or social challenges like unemployment and marginalisation (Max-Neef, 1992). There are five categories of satisfiers (Max-Neef, 1992):

- Violators or destroyers fail to satisfy the need they are aimed at, while rendering satisfaction of other needs impossible. Censorship is aimed at the need for protection, but ends up impairing satisfaction of understanding, participation, leisure, creation, identity and freedom.
- Pseudo-satisfiers generate false sensations of satisfaction, while making it harder to satisfy the needs they are aimed at. Status symbols may seemingly satisfy the need for identity.
- Inhibiting satisfiers over-satisfy the need they are aimed at, and tend to inhibit satisfaction of others. Commercial television is supposedly satisfying the need for leisure, but prevents satisfaction of understanding, creation and identity.
- Singular satisfiers satisfy one category of needs without influencing the satisfaction of others. Food programmes satisfy the need for subsistence.
- Synergistic satisfiers satisfy different needs simultaneously. Direct democracy satisfies the need for participation while stimulating the satisfaction of needs for protection, understanding, identity and freedom.

In contrast, wants are acquired by learning (Mont, 2001): When their ability to provide satisfaction is learned, they become habits and may be perceived as needs. Desires are passions incorporating imagination and cravings for consumer goods (Belk *et al.*, 2003). When goods and not needs become ends, goods' potential as satisfiers may be impaired (Max-Neef, 1992).

All of this underlines how complex and non-linear the interrelation between consumption and satisfaction of needs may be (Jackson and Marks, 1999). However, both Maslow and Max-Neef distinguish certain material needs, principally the needs for subsistence and protection. To satisfy them, a minimum of material resources are required.

Material progress increases welfare up to a certain level, but in developed countries most people reached and passed it a long time ago (Røpke, 1999; Jackson and Marks, 1999). The last four decades' increased income seems not to have given rising levels of quality of life, well-being or happiness (Gardner and Assadourian, 2004; Tukker *et al.*, 2006). Max-Neef's (1995) 'threshold hypothesis' suggests that in every society, economic growth brings improved quality of life up to a certain point, before the quality of life may start to decrease due to the environmental and social costs of continued economic growth.

Jackson and Marks's (1999) study of UK's consumption growth between 1954 and 1994 shows a population increasingly trying to satisfy non-material needs in material-intensive ways: Post-material consumption patterns do not reflect post-material attitudes (Jackson and Marks, 1999). Max-Neef's framework implies that material consumption at best can offer pseudo-satisfaction of non-material needs, at worst inhibit or violate satisfaction (Jackson and Marks, 1999). Good relationships are among the principal ingredients of a good life (Gardner and Assadourian, 2004), but in developed countries social and humanistic needs seem to be the most neglected (Briceno and Stagl, 2006). While demands for a shift towards dematerialised consumption are often perceived as threatening and potential constraints to human welfare, Jackson and Marks (1999) conclude that the real threats and constraints to human welfare are existing consumption

patterns. Gardner and Assadourian (2004) urge rethinking what 'good life' is, and to redefine 'prosperity' to emphasise quality of life, not merely accumulation of goods.

The most radical strategies for curbing consumption are based on sufficiency principles (Mont and Plepys, 2008). Hofstetter *et al.* (2005) maintain that consuming more not necessarily increases happiness: Their first hypothesis addresses the existence of a saturation level. The better a consumption practice fulfils basic needs and maximises utility, the lower will the inclination towards further consumption be. The second is that maximisation of utility is possible without increased or with less than average material consumption, adopting happiness instead of money as the ultimate basis for design and development. Rebound effects may however occur: Activities identified as happiness-enhancing and not material-intensive may drive, rather than curb unsustainable behaviour. Yoga classes may encourage study trips to India; hiking means acquisition of all kinds of gear including boots, backpacks and rainwear. The value consumption has to people – spending a weekend abroad or having a glass of wine before going to bed – should not be underestimated: Personal values may determine whether behavioural change can reduce consumption.

2.1.3.2 Attitudes, values, intentions

Environmentally significant behaviour may be defined by its direct or indirect environmental impact, or in terms of intent, as behaviour undertaken to change the environment, normally in beneficial ways (Stern, 2000). The former is useful to identify low-hanging fruits, the latter to understand what triggers behaviour and how to change it (Stern, 2000). Mainstream psychologists see attitudes, values and intentions as the main drivers of human behaviour (Jelsma, 2006). Pro-environmental behaviour is behaviour consciously seeking to minimise the negative impact of one's actions on the natural or built world (Kollmuss and Agyeman, 2002). People's attitudes towards the environment and ecological behaviour are used to predict ecological behaviour (Kaiser *et al.*, 1999).

Stern's (2000) value-belief-norm theory connects values to behaviour through a five-variable chain: Personal values precede beliefs about the biophysical environment. The beliefs include perceptions of environmental conditions as threatening to personal values, and beliefs that individual actions may reduce them. The beliefs activate pro-environmental norms with a sense of obligation to take action through pro-environmental behaviour, which is then activated (Stern, 2000). Stern (2000) acknowledges that an integrated model of pro-environmental behaviour would consist of four aspects: Attitudinal factors, contextual forces, personal capabilities and habits.

The theory of planned behaviour is based on the theory of reasoned action, extended with the variable perceived behavioural control (Kaiser *et al.*, 1999). Here, intention to perform an action precedes behaviour. Intention is function of individual attitudes towards performing an action, and subjective norms – what others are perceived to expect, normative expectations and the motivation to comply. Information or knowledge is a precondition for the attitudes, while subjective norms are based on personal and social values. Perceived behavioural control is the individual's belief

about how easy it will be to perform the behaviour (Jackson, 2005). Usually, intention to act environmentally has the strongest relation to ecological behaviour (Kaiser *et al.*, 1999), but people do not necessarily have an inner goal to reduce consumption. Egoistic values tend to be negatively correlated with pro-environmental norms and actions (Stern, 2000).

To sum up, internal factors influencing pro-environmental behaviour are motivation, environmental knowledge, values, attitudes, environmental awareness, emotional involvement, locus of control, priorities and feelings of responsibility (Kollmuss and Agyeman, 2002). Other relevant individual factors are personal capabilities like knowledge and skills, availability of time and general capabilities and resources like literacy, money, social status and power (Stern, 2000). Socio-demographic variables such as age, education, race and income may be indicators for personal capabilities (Stern, 2000).

External constraints like economy, social pressures and institutional aspects may prevent pro-environmental behaviour (Kaiser *et al.*, 1999; Kollmuss and Agyeman, 2002). Air temperature and building characteristics influence energy consumption; costs and availability of water influences water conservation. Socio-cultural constraints determine how easy it is to carry out ecological behaviours (Kaiser *et al.*, 1999). Political measures may facilitate recycling or place charges on garbage disposal; cheap, efficient public transportation offers people an alternative to car commuting. Social norms, expectations and cultural values are other influences (Jackson, 2005). Descriptive norms refer to what most people do (Jackson, 2005): If most people download music and movies illegally, one may be tempted to follow. Injunctive social norms refer to what ought to be done, reflecting the moral rules or guidelines of a social group, connected to social rewards and sanctions (Jackson, 2005). Social norms motivate and constrain lifestyles. Psychological social pressure-related consumption-drivers are hard to change (Mont and Plepys, 2008), but behavioural change-initiatives are claimed to be most effective at a community level (McKenzie-Mohr, 2000; Briceno and Stagl, 2006).

'Spillover-effects' show how pro-environmental attitudes can transmit from one area to another: A positive attitude towards recycling may trigger positive attitudes towards using public transportation, even when the attitudes initially are not consistent. Cognitive or emotional discomfort may encourage individuals to change their attitudes (Jackson, 2005). Behaviours may also influence attitudes directly: People engaged in recycling are found to have more positive attitudes towards other pro-environmental behaviours, independently of their recycling attitudes (Jackson, 2005). Hence, pro-environmental behaviour does not always follow attitude or intention, and behaviour can be changed without changing people's attitudes first (Jackson, 2005).

Simultaneously, pro-environmental behaviour is not necessarily morally motivated, and there is not necessarily correspondence between pro-environmental attitudes, intentions and behaviour and reduced environmental impact of a household (Jackson, 2005). The many factors causing and blocking pro-environmental behaviour contribute to the perception that people behave inconsistently (Kaiser *et al.*, 1999).

2.1.3.3 Habits and routines

In everyday life practice, behaviour is embedded in habits and routines (Jelsma, 2006). Our actions are not always results of processes of conscious cognitive reflection, but may be instinctive, automatic responses to stimuli (Jackson, 2005). Cognitive psychology considers habits important to function efficiently in message-dense environments (Jackson, 2005). Habits reduce the cognitive efforts of decision-making, enabling us to execute daily routines with a minimum of reasoning and awareness (Jackson, 2005). They are formed by repetition and reinforcement, and strengthened the more they are repeated and the stronger the reinforcement (Jackson, 2005). They may be acquired consciously, subconsciously or through social learning by copying others, and spread to circumstances similar to their origin (Heijs, 2006a). Habits are most successful under stable circumstances (Jackson, 2005). They may however trigger behaviour contradictory to our intentions (Jackson, 2005). If cognitive dissonance encourages us to break a habit, its reinforcement is traded off against the perceived scale of the habit's long-term disadvantages, and in the end, we may choose adjustment of goals over breaking a habit (Jackson, 2005).

Being key operating procedures, habits are relevant to environmentally significant behaviour (Stern, 2000). Breaking habitual behaviour is a challenge to behavioural change initiatives (Jackson, 2005), while creation of new habits is a way of establishing behavioural change (Stern, 2000).

3 Behavioural change: Enablers and limitations

As shown, a range of interrelated factors and mechanisms drive and influence consumption. People often find themselves locked into behavioural patterns (Jackson, 2005). Drawing on literature, this section provides an overview of possible intervention strategies that may facilitate the change towards sustainable consumption. Four main strategies are identified: Political measures, education, community-based social marketing and technology. Here, possibilities for industrial design contribution are emphasised.

3.1 Political intervention strategies

Support for political measures to constrain consumption is hard to obtain, due to the complexity of interests and driving forces on all levels (Røpke, 1999). However, both through interventions and the absence of them, governments influence and co-create consumption-cultures; they set examples and influence social norms, ethical codes and cultural expectations through own policies, actions, signals and messages (Jackson, 2005).

Mont and Plepys (2008) list three main groups of relevant political instruments: Administrative, economic and informational. Regulatory instruments like control with emissions and product standards are aimed at producers; economic instruments including tax reforms and product charges affect producers, but are aimed at final consumers (Mont and Plepys, 2008). Information instruments aimed at consumers include awareness raising campaigns, education and eco-labelling schemes; those aimed at producers include labelling schemes (Mont and Plepys, 2008). Jackson (2005) lists four 'solutions': (1) Laws, regulations and incentives, (2) educational

programmes, (3) community management and (4) moral, religious and ethical appeals. Usually, a combination of fiscal incentives designed to internalise social and environmental externalities and information, supposed to make sure people make informed choices, is applied (Jackson, 2005). Fiscal incentives have shown limited ability to cause long-term behavioural change (Jackson, 2005).

Political interventions have been criticised for not challenging assumptions about material growth-based economic systems and facilitating the change towards less material-intensive, more sufficiency-oriented practices (Mont and Plepys, 2008), and for not recognising the fusion of cultural practices, social interactions and human emotions that influence the behaviour of citizens, groups and institutions (Jackson, 2005). The strategies of community management and moral and ethical appeals are rarely applied.

3.1.1 Community management

Strong group rules can facilitate effective management of common resources, e.g. marine resources or grazing ground, over long periods of time, based on combinations of participatory decision-making, monitoring, social norms and community sanctions (Jackson, 2005). Social norms and expectations are here the most important influences. The main success factors are that the resources are locally controlled, that the local community is small, stable, has shared norms, sufficient local knowledge and is sufficiently dependent on the resource, and that adequate rules and procedures are established (Jackson, 2005). Aspects possibly rendering the approach unsuitable to promote sustainable consumption include that the global nature of the climate change and consumption growth challenges causes a perceived gap between behaviour and consequence, and that trends of individualisation, ideological transitions and globalisation are likely to undermine the social conditions for community management (Jackson, 2005).

3.1.2 Moral appeals

Despite moral relativism and declining religious authorities, every society has basic moral and ethical codes (Jackson, 2005): All citizens have the right to life and health. When individual freedom becomes a threat to the well-being of others, political efforts limiting individual freedom may be justified (Jackson, 2005; Brey, 2006b). Passionate public debates or ‘moral conversations’ like those on public space smoking, stem cell research, management of carnivore animals and the behaviour of multi-national companies prove the presence of a public concern related to a range of issues (Jackson, 2005). To strengthen the impact of their policy interventions, governments may stimulate, facilitate or initiate such discussions actively (Jackson, 2005).

In his proposal for a reorientation of society, Max-Neef (1992) argues that realisation of fundamental human needs should be the motor, rather than the goal of development.

3.2 Educational intervention strategies

Educational interventions seek to raise awareness about sustainability issues, communicate benefits and ways of leading sustainable lives and

persuade the target groups into adopting more sustainable consumption patterns. Information incentives aimed at consumers are based on the assumption that information will change people's attitudes and thus behaviour in a pro-environmental or pro-social way (Jackson, 2005). Persuasion's effectiveness was earlier considered as limited to the source's credibility, the message's persuasiveness and the recipient's responsiveness, but empirical evidence indicates that learning may happen without attitudinal change, and that attitudes and behaviour can change without absorption of persuasive messages (Jackson, 2005). Other important aspects are to know the audience, structure the appeal around a core message, consider its immediacy, directness, relevance and emotional and imaginative appeal, use involvement signs like stickers and badges and identify cues helping people bring the message to mind. Information is a widespread measure, but not enough to change people's behaviour (McKenzie-Mohr, 2000; Jackson, 2005; Lilley *et al.*, 2005). Consumers have limited ability, interest and willingness to absorb and act upon product-related environmental information, despite their best intentions and high recognition of information systems (Leire and Thidell, 2005). According to behavioural psychology, trial and error, observation of others and others' responses to own behaviour are far more effective ways of achieving behavioural change (Jackson, 2005). According to social learning theory, learning happens most effectively when learning from social models attractive or influential to us, celebrities, successful or powerful people or people who are like us (Jackson, 2005). Punishment and reward strategies are more likely to make people buy green products than information about their indirect relative carbon emissions. The problem is not lack of information (Leire and Thidell, 2005).

3.3 Community-based social marketing

The hybrid of psychology and social marketing, community-based social marketing (McKenzie-Mohr, 2000), is based on understanding people's experienced barriers towards engaging in certain activities (Jackson, 2005). The process consists of selection of an activity to promote, identification of barriers towards it, design of a strategy to overcome the barriers, pilot testing, implementation in a community and evaluation of the program's impact (McKenzie-Mohr, 2000). Psychological behaviour change methods coupled with socio-psychological insights are central at the design stage, providing knowledge about what constrains and motivates behaviour (McKenzie-Mohr, 2000; Jackson, 2005). The behavioural change methods include commitment techniques with 'foot in the door' effects and prompts – visual and auditory aids reminding people of carrying out activities (McKenzie-Mohr, 2000). Carefully designed community-based social marketing strategies can have a significant impact, even on routine behaviour (Jackson, 2005).

3.4 Technological intervention strategies

Possibilities for behavioural change through technological intervention are many, but relatively unexplored. Social aspects are challenges to policy intervention, and socio-technical systems, infrastructure, goods and services limit individuals' possibilities to consume in sustainable ways. Drawing on economical, socio-economical and socio-psychological insights, the paper focuses on opportunities for industrial design contribution. The many socio-

psychological factors shaping and influencing individual behaviour make a potential cross-pollination of user-centred design with design for sustainability particularly interesting.

3.4.1 User-centred design for sustainability

Norman (1988) defines user-centred design as a 'philosophy based on the needs and interests of the user, with an emphasis on making products usable and understandable'. Adding sustainability as another goal opens up for consideration of needs-based design strategies that can facilitate sustainable behaviour, and the practical and ethical issues arising in their wake.

In design disciplines such as interaction design, user-centred or user-involved approaches are central. User-centred processes are characterised by early focus on users and tasks, empirical measurements and iterative cycles of design, test, measure and redesign (Preece *et al.*, 2002).

Analysing universal design, participatory design, ecological design, feminist design and socially responsible design, Nieusma (2004) distils five central challenges: Accounting for diversity and different needs, coping with disagreement and uncertainty, understanding governing mentalities and thinking through agency. These are relevant to design for sustainability, where values and expert knowledge are translated into design for a broad range of people and purposes, to trigger behavioural change for a common good.

3.4.1.1 The user phase

The user phase stretches from acquisition to disposal. Weger *et al.* (2001) identify the sub-phases 'purchase', 'starting operations', 'use', 'maintenance or repair' and 'decommissioning'. Consumption is not limited to interaction with and disposal of products and services: Choosing the right product or service is also a contribution towards sustainable consumption patterns.

3.4.1.2 Level of innovation

Achieving efficiency improvements of factor 4-20 considered necessary for sustainable development requires more than technological innovation and behavioural change alone (Knot and Luiten, 2006). More radical levels of innovation may enable satisfaction of human needs in substantially more sustainable ways.

Aiming for development of what Max-Neef (1992) calls synergistic satisfiers several needs can be satisfied simultaneously. A dematerialised economy and consumption growth can reduce production and consumption's environmental impact by providing consumers with functionality or satisfaction of material products, instead of actual products (Mont, 2002; Tukker and Tischner, 2006). The fundamental idea behind product-service systems – integrated solutions of products and services providing product use value (Tan and McAloone, 2006), is more quality of life with less material intensity (Mont, 2001). Systems are however not inherently sustainable, and existing structures, routines and companies can not necessarily be re-used to deliver product functionality (Mont, 2002; Tukker and Tischner, 2006; Mont and Plepys, 2008). There are three main types of product-service systems: (1) 'Product-oriented services' with services added

to existing systems, (2) 'use-oriented services' with intensified product use through pooling or sharing and (3) truly need-oriented 'result-oriented services' that, depending on how functionality is fulfilled, potentially imply 'Factor X' efficiency improvements (Tukker and Tischner, 2006). The sustainability potential has however mostly been explored in academia (Briceno and Stagl, 2006), and little is known about the service features that make consumers choose services over products (Mont and Plepys, 2008). Additionally, the most radical 'Factor X' improvements can not be achieved by single companies, as contextual change is required and companies must adapt their business model to the context (Tukker and Tischner, 2006).

3.4.1.3 Strategies for user-centred design for sustainability

Design for behavioural change includes both physical and psychological interventions. Previous research (Lilley *et al.*, 2005) has distinguished three main strategies for product-led sustainable consumption: Eco-feedback, scripting and behavioural steering and intelligent products and systems. A fourth strategy of emotional attachment is added. The classification is not intended to be definitive or comprehensive.

Eco-feedback

Eco-feedback strategies are based on Kluger and DeNisi's (1996) feedback intervention theory (FIT). They imply that products or systems provide users with information about behavioural consequences in appropriate formats and related to specific goals, to persuade them into sustainable behaviour. Van Raaij and Verhallen (1983) list three feedback functions: Habit formation, learning consequences of specific behaviour, and internalisation, for example attitude formation. A reward function linked to motivation has been added later (van Houwelingen and van Raaij, 1989). Feedback is needed to assess one's performance related to a goal, but does not consistently lead to performance improvements (Kluger and DeNisi, 1996). Unevaluated feedback is neutral information, and energy savings are only achieved when users have a specific goal to save energy (McCalley and Midden, 2002). Goals and standards are organised hierarchically, and goals to save energy may have lower priority than goals of e.g. comfort and convenience (McCalley and Midden, 2002; 2006). When goal-setting is encouraged, feedback should be frequent and specific (McCalley and Midden, 2006). However, 'fallback effects' may occur when newness wears off and reactions to change diminish (Wood and Newborough, 2003).

Persuasive technologies are intentionally designed to trigger voluntary change of people's attitude, behaviour or both (IJsselstein *et al.*, 2006). Force and misinformation is not accepted. Computers are central to persuasive technology enabling deliverance of appropriate, persuasive 'just in time' messages at the appropriate place (IJsselstein *et al.*, 2006). As human attention is limited only feedback-standard gaps that receive attention participate actively in behavioural regulation (McCalley and Midden, 2006). Application of more intrusive feedback types can make users aware of a system's status or break habits, e.g. by 'unfreezing' existing behaviour, raising it to a discursive level where different strategies can be evaluated (Jackson, 2005). As to habits, technological interventions should preferably

be used to the ones that are learned and started unconsciously, performed automatically and less sensitive to information (Heijs, 2006a).

An example of eco-feedback is feedback on fuel-efficiency in cars.

Scripts and behavioural steering

A 'script' is the preferred interpretation or framework for action 'encoded' or 'inscribed' into a product by its designer (Akrich, 1992; Røpke, 2001). The properties of scripts include force – the magnitude of force exerted to users' actions, scale – the level of complexity, direction – the socio-technical direction the resistance gradient is aimed at, and distribution of tasks, responsibility and power (Jelsma, 2006). Scripts may potentially obstruct unsustainable use or facilitate sustainable use to an extent where it is performed almost without thinking.

Affordances are clues or combinations of physical object properties inviting specific ways of use without intervention from cognition or evaluation (Norman, 1988; Heijs, 2006b). By looking at it, a user may perceive whether a switch should be turned or pushed. Affordances may depend on users' knowledge and experience, are neither subjective nor objective and exist on a perceptual level (Heijs, 2006b). While affordances suggest the range of possibilities, constraints prevent or discourage behaviour (Brey, 2006a). Constraints include physical properties, semantic aspects related to situations' meanings, cultural aspects depending on cultural-relative conventions or logical relationships between spatial or functional layout of components and what they affect or are affected by (Norman, 1988). Brey (2006a) lists five variables affecting affordances and constraints: (1) Behaviour, (2) user-profile, (3) material and infrastructural context, (4) social context and (5) cultural contexts and practices.

Examples of behavioural steering include public benches split into separate seats by armrests to avoid people lying down to sleep, the use of stay-on tabs on soda cans preventing tabs from being littered and speed-bumps in residential neighbourhoods.

Forced and blocked behaviour

When artefacts fully control functions it is called automation or delegation of tasks (Jelsma, 2006). Intelligent products or systems may automatically optimise their performance according to changing circumstances and sustainability criteria. Products or services forcing or blocking behaviour may be experienced as intrusive. There are decisions we prefer technology to make, like when to open and retract awnings or inflate airbags, but as it starts determining superior goals like where to drive without letting us overrule it, it threatens our autonomy (Brey, 2006b). At the same time, the unnoticed interference of products or systems adapting to user behaviour to optimise performance according to sustainability criteria may restrict users' recognition of sustainability issues (Lilley *et al.*, 2005).

Examples of intelligent products include movement sensors switching lights on and off when people enter or leave, TV sets automatically adjusting brightness and contrast settings to light conditions and Mini Cooper which when stopping switches the engine off as the driver shifts to neutral and lifts the foot off the clutch pedal.

Emotional attachment

Enhancing products and services' emotional and social durability to strengthen product-user relationships is relevant to purchase decisions and life-time extension. A product's technical life depends on design, materials, cost of repair, reparability and availability of spare parts. Its economical life ends when costs are considered too high compared with purchasing a new product. Its psychological life ends when the user no longer uses or wants the product. Ideally, the three should correspond, but the majority of durable consumer products seem to be discarded for psychological reasons (Muis, 2006). The meaning of products deserves more attention (Muis, 2006). Acquisition modes are other factors at play (Shove et al, 1998): A wedding gift is more likely to be kept longer than a supermarket bargain. Availability of more energy-efficient alternatives and take-back and recycling systems may however justify product replacement.

Hofstetter *et al.* (2005) propose a 10-step checklist to design for sustainable consumption: Based on needs, satisfiers and happiness enhancers, it aims for substitution of activities, products and services with new, sustainable ones where the number of happiness-enhancers and satisfied needs is maximised. An index for assessment and ranking, 'CHap', is also introduced. It quantifies activities, products and services' contribution to increased happiness and to what expense in CO_2 emissions, taking simultaneous changes and rebound effects into account (Hofstetter *et al.*, 2005).

Examples of emotionally durable design may include pieces of art, one's favourite watch or the teddy-bear one had as a child.

3.4.2 Limitations to user-centred design for sustainability

3.4.2.1 Ethical implications

It is easy to imagine scenarios where persuasive or behaviour-steering technology violates personal freedom or rights and no longer can be justified by a beneficial aim, but hard to define where the limit goes (Brey, 2006b). Persuasive technologies should be responsive to, and to some extent under the control of, the persuaded party (Berdichevsky and Neuenschwander, 1999). Persuasive and behaviour-steering technologies aim to make users behave in accordance with the values and desires of someone else (Brey, 2006b), but distribute responsibility between the persuader and the persuaded (Berdichevsky and Neuenschwander, 1999).

3.4.2.2 Rebound effects

Rebound effects are undesired consequences of for example energy-efficiency improvement efforts. Hertwich (2005) describes them as offsets in effects of measures taken to reduce environmental impacts, due to behavioural or other systemic responses. Rebound effects lead to environmental benefits lower than expected or even negative results.

Greening *et al.* (2000) list four kinds of rebound effects regarding economic mechanisms: (1) Direct rebound effects, (2) secondary fuel use effects, (3) market-clearing price and quantity adjustments or economy-wide effects and (4) transformational effects. Direct rebound effects occur on the individual household-level, and may be decomposed into substitution, income effects and secondary effects (Greening *et al.*, 2000). Slob and

Verbeek (2006) distinguish between three types: (1) Increased product use – changing to energy-saving light bulbs and never switching them off, (2) bypassing technology or not using it at all – inventing ways of escaping movement detectors for lighting and (3) unintended use – rinsing dishes before loading them into the dishwasher. Considering the dynamics of domestication is relevant to avoid rebound effects.

4 Framework for analysis

The review of strategies for user-centred design for sustainability has distinguished three main variables.

- A strategy's level of innovation and potential or desired efficiency improvement factor.
- A strategy's control mechanism, referring to the distribution of control between product or system and user, and whether the influence is physical or psychological.
- The sub-phase of the usage stage addressed by the strategy.

Based on a newly proposed framework for analysis (Figure 1), incorporating the variables listed above, ongoing research at NTNU explores the possibilities for cross-pollinating user-centred design and design for sustainability, aiming for improvements contributing towards sustainable consumption patterns. Building on existing literature, such as Max-Neef's needs framework, Stern's, Kollmuss and Agyeman's and Kaiser *et al.*'s lists of factors influencing pro-environmental behaviour and the different identified intervention strategies, future publications will, through systematic exploration and consideration of variable sets, address how the solution space can be described in terms of enablers, methodological support, limitations and examples that may already exist.

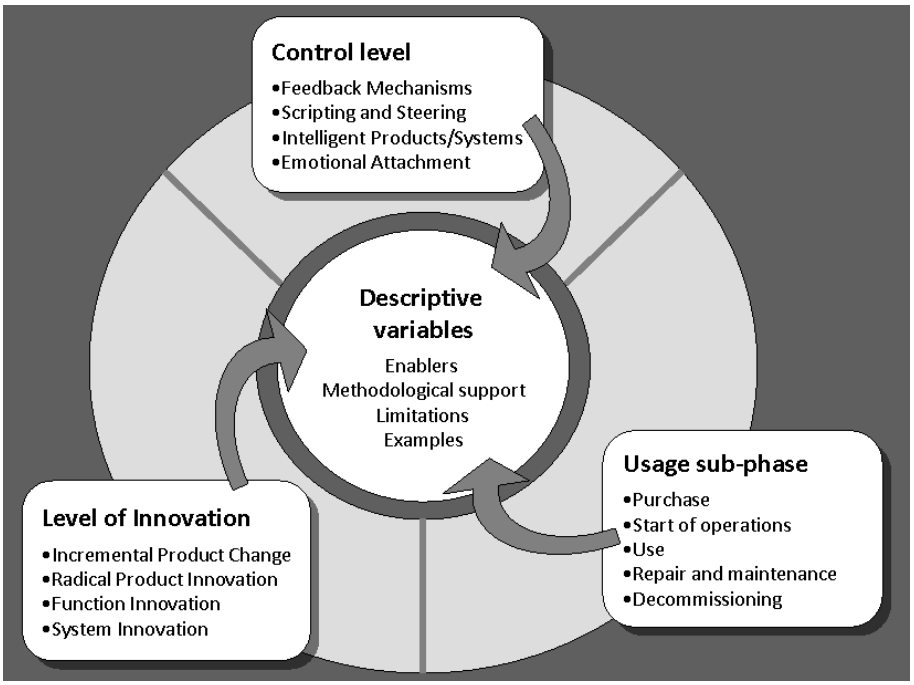

Figure 1: Input and descriptive variables for assessment of the solution space

5 Conclusion

Industrial designers should be aware of their responsibility in the challenge of sustainable production and consumption, as well as the ways in which they may actually contribute, for example by addressing behaviour. Ideally industrial designers should be equipped with a decision-making tool, enabling evaluation of alternatives in order to choose the strategies best suited for each project. A step towards such a tool is further exploration of the variables identified in the review of user-centred strategies for sustainable design.

Interventions to change consumption patterns should be based on thorough understanding of the different dynamics and factors that influence human behaviour, as well as ethical and moral implications. Motivation and democratisation are other relevant aspects, opening for further exploration of possibilities for learning from the communities of participatory design and community-based social marketing.

User-centred design for sustainability may alone not curb consumption, but as part of joint intervention efforts, it can make a difference.

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Chapter 7 Chemical Leasing and Cleaner Production

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1 Introduction

Globalization, changing patterns of consumption and production and increased environmental concerns are creating new challenges for companies in developing countries and countries with economies in transition to stay competitive in the global market. Integrated and multidisciplinary approaches are required to face the dramatic rises in intensive use of natural resources and over-reliance on the ability of the natural environment to absorb the wastes generated by economic activity.

To address the challenges of the new global context and to enhance economy wide productivity in a sustainable manner, the United Nations Industrial Development Organization (UNIDO) focuses its activities on three thematic priorities: poverty reduction through productive activities, trade capacity building and environment and energy.

The organization's worldwide Cleaner Production Programme is an important tool to bridge these three priorities and plays a fundamental role in promoting sustainable industrial development and sound chemicals management in developing countries and countries with economies in transition.

The Cleaner Production concept was adopted by the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil in 1992 as an efficient means to achieve sustainable industrial development. It is an integrated preventive environmental strategy to increase resource efficiency and to reduce risks to humans and the environment. It aims at minimizing the generation of pollution and waste at source, rather than addressing and mitigating just the symptoms by only

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme

technically “dealing with” an existing waste/pollution problem. Cleaner Production can be applied to production processes, products and services.

2 Cleaner Production and Sustainable Industrial Resource Management

Based on its experience in applying CP to industry at a global level, UNIDO further developed UNEP’s CP concept and launched in 2002 the Holistic CP approach that emphasizes the company and sectoral level and takes into account the whole product cycle.

A critical element of Cleaner Production is that it results in a “win-win” scenario for industry and the environment as it implies striving for continuous resource efficiency to create economic savings for the company. In this way it enhances the competitiveness of industry, promoting sustained social advancement in a way which is compatible with environmental protection.

At company level, the activities should progressively go beyond process improvement to take the whole product cycle into account, from raw material production to product recycling and/or disposal and involving all functions and departments of the company as well as suppliers and customers. This holistic approach allows the companies to design, produce and promote innovative, environmentally and economically sound products, improving their ability to successfully negotiate their position in the global markets.

At the sectoral level, national sector-specific CP strategies should be developed. This would allow CP interventions at company level to be put into a broader perspective and would point out possible synergies between companies, suppliers and customers, making it possible to optimize the gains obtained at the sector and national levels. It would also allow for more coherent choices in technology development and transfer in the country as well as the preparation of coherent investment plans to be presented to potentially interested companies and financial institutions.

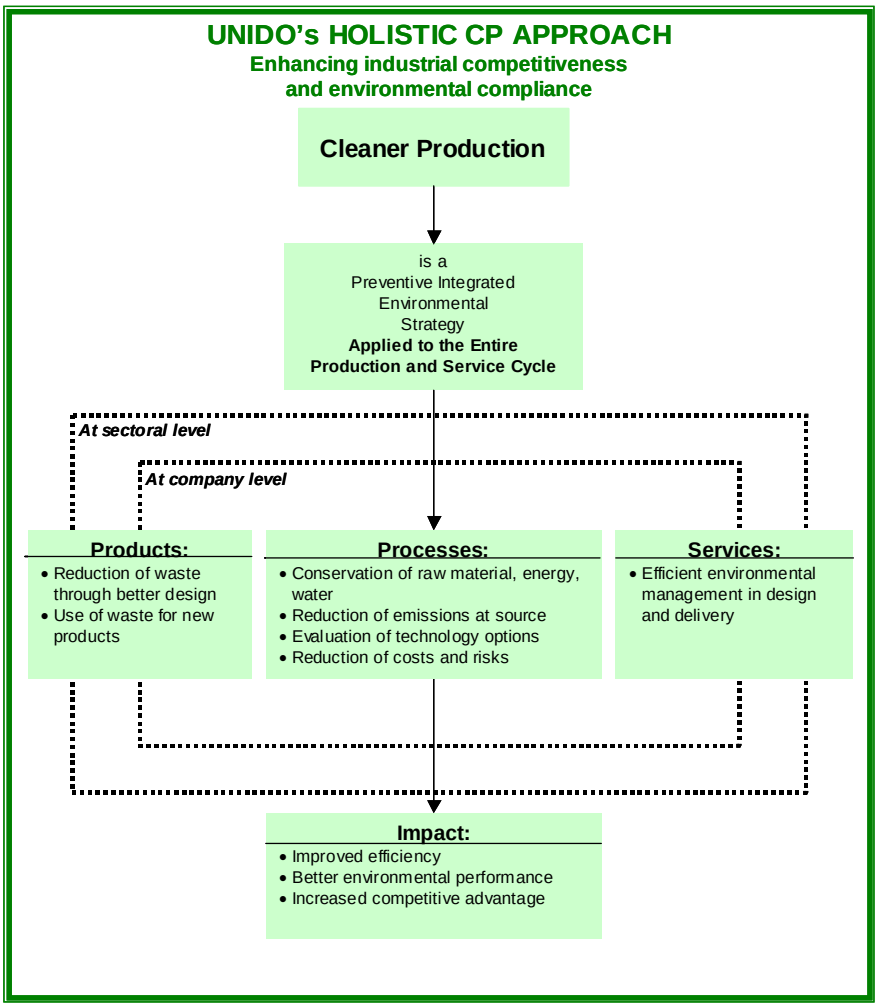

Figure 1: UNIDO's Holistic CP Approach

UNIDO recently developed its new Sustainable Industrial Resource Management (SIRM) strategy. Unlike the traditional approaches to environmental management, the SIRM concept promotes the idea of achieving sustainable industrial development through the implementation of circular material and energy flows in the entire production chain and the reduction of the amount of material and energy used by means of solutions for greater efficiency. It focuses on the idea that total materials cycles can be optimized and modelled on the self-sustaining cycles of nature. The SIRM concept abandons the "cradle to grave" principle of linear product cycles and aims at effectively closing the material and energy loops. The above-indicated objectives are expected to be achieved through the following means:

1. Separation of the material flows into two parts: technical flow (including non biodegradable materials) and nutrients flow (with organic and biodegradable materials) to facilitate internal recycling and reuse;
   Substitution of non-renewable energy sources by renewable ones.

2. In addition, the SIRM approach seeks to develop new models to encourage a shift from selling products to supplying services; modifying in this manner the supplier/user relationship and resulting in a win-win situation for the economy and the environment. Chemical Leasing is an example of this type of new service-oriented business model.

3 Chemical Leasing

The concept of Chemical Leasing is based on the preventive idea of Cleaner Production. It is a shift from the traditional business concept that focuses on a constant increase in sales volume towards a more service and value-added approach. Chemical Leasing business models provide concrete solutions to the effective management of chemicals and to negative releases to the environment.

The development and implementation of Chemical Leasing business models is one of the potential approaches to address the problems related to ineffective use and over-consumption of chemicals. These provide concrete solutions to the effective management of chemicals and on ways negative releases to the environment can be reduced.

The Chemical Leasing models take for granted that the traditional chemical industry is focused on increasing the sales' volume of chemicals. Any measure that increases the efficiency of use and consumption of chemicals by reducing the quantity of chemicals applied directly lowers the profits of the producer. Even though chemical industry is reluctant to change its sale strategies, future business strategies may require a shift in paradigm away from the focus on increasing sales volume of chemicals towards an extended responsibility throughout the whole life cycle.

The Chemical Leasing approach is a strategy that addresses the obligations of the changing international chemicals policy by focusing on a more service-oriented strategy. The producer does not only sell the chemical but also the associated know-how. This relates to product volumes, conditions of use, recycling concepts and disposal. In addition, while in the traditional model the responsibility of the producer stops when the chemical is sold, in the current approach, the producer remains responsible throughout the use and treatment, disposal and recycling phases.

Different approaches may be adopted in order to implement the Chemical Leasing models and their classification is based on the following criteria:

1. Who owns the substance?
2. Who owns the plant?
3. Who operates the plant?
4. Where is the plant located?

In addition, the following stakeholders are taken into consideration:

1. Manufacturer and supplier of chemicals;
2. User;
3. Disposal company;
4. Plant and equipment supplier.

The Chemical Leasing models stated in Table 1 have been identified for potential implementation. The selection of one of these models depends on the country specific situation and, more in detail, on the following:

1. Properties of the chemical;
2. Viability of suitable substances;
3. Degree of process specialization and specialization of the plant where the chemicals are used;
4. Integration and significance of the process in the user’s production process.

Table 1: General characteristics of the Chemical Leasing business models

Denomination	**Basic characteristics**
Standard case	Ownership passes first over from the supplier to the user and then from the user to the disposal company. No cooperation between the user, supplier, and disposal company. User owns the application plant, the disposal company owns the disposal plant. Application plant located on the user's premises and operated by him, the disposal company operates the disposal plant on its premises.
Supplier/disposal company cooperation	Ownership passes first over from the supplier to the user and then from the user to the disposal company. The supplier and the disposal company cooperate on the disposal and/or recycling of the substance for reuse by the supplier. User owns the application plant, the disposal company owns the disposal plant. Application plant located on the user's premises and operated by him, the disposal company operates the disposal plant on its premises.
User/disposal company cooperation	User owns the substance, ownership may pass over to the disposal company. The user and the disposal company cooperate on the disposal and/or recycling of the substance for reuse by the user. User owns the application plant, the disposal company owns the disposal plant. Application plant located on the user's premises and operated by him, the disposal company operates the disposal plant on its premises.
Supplier service	Substance stays property of supplier. Supplier owns the application plant, the disposal company owns the disposal plant. The user operates the application plant on its premises, the disposal company operates the disposal plant on its premises.
Responsible care model	Ownership of the substance passes over to the user. User owns the application plant, the supplier owns the disposal plant. Application plant is located on the users premises and operated by user, the disposal plant is located at the supplier's premises and operated by supplier.
Client operation model	Supplier retains ownership of the substance. Supplier owns the application and the disposal plants. The user operates the application plant on its premises, the disposal plant may be located either on the user's or the supplier's premises and is operated respectively.
Supplier cooperation model	Ownership of the substances passes between supplier and disposal company. Supplier owns application plant, disposal plant is owned by the disposal company. The application plant is located at the user's or supplier's premises, the disposal company operates the disposal plant on its premises.

Denomination	Basic characteristics
Total care model	Ownership of substance is retailed by supplier. Supplier owns the plant where the substance is used and the disposal plant. The application plant and the disposal plant are operated by the supplier either at the user's or on the supplier's premises.
Client care model	User owns the chemical substance. User owns the application and recovery plant. Application and recovery plants are located on the user's premises and operated by him.

As illustrated in the different possible approaches, production, use, disposal and recovery of chemicals have to be included in Chemical Leasing business models. The Chemical Leasing models associate to the basic concepts of the SIRM principle in the following manner:

- The concept of purchase of a product is substituted by the concept of purchase of a service (product and associated know-how);

- The Chemical Leasing models incorporate the life cycle approach of chemicals by interlinking different steps in the production and utilization of the materials, thus, effectively closing the loops between waste from one process and raw materials for the next.

Based on the experience already achieved, Chemical Leasing models create the largest value added for simple chemical applications, such as cleaning, greasing/degreasing, and cooling/heating. In order to maximize the impact, chemicals should be applied within closed systems. Furthermore, they should not be part of the product and be highly concentrated in waste, as one of the prerequisites of Chemical Leasing models is the recycling of the chemical.

Potential chemicals for the application of the Chemicals Leasing model particularly include high risk chemicals, such as cancerogenous, expolsive, or caustic substances, or high value chemicals, such as catalytic converters used in organic synthesis. Table 2 illustrates potential chemicals for the application of the model and their use.

Table 2: Potential chemicals in Chemical Leasing business models

Application	Chemicals	Activities involved
Cleaning/degreasing –solvents	Solvent agents	Treatment of iron/steel; treatment of non-ferrous metals; surface treatment; electronic motors, generators; electronics
Adsorption/desorption	e.g. activated carbon	Chemical products; printing; mineral oil processing; food and stimulants; electrical engineering
Pickling	e.g. hydrochloric acid, sulfuric acid, nitric acid, hydrofluoric acid	Treatment of iron/steel; manufacture of plastic products; surface treatment
Synthesis (e.g. poly-condensation)	e.g. dimethylform-amide, butyl acetate, dichloromethane, chlorobenzene	Manufacture of chemical parent substances; manufacture of chemical fibers
Extraction	e.g. chloroform, chlorobenzene, dichloromethane, hexane, methanol, propanol, butanol, acetone, acetic ester, ethanol	Manufacture of chemicals; manufacture of chemical fibers; manufacture of pharmaceutical products; detergent and cleaning agents; manufacture of pyrotechnical products; photochemical products; manufacture of other chemical products; manufacture of essential oils
Cooling/lubrication	emulsions	Treatment of iron/steel; treatment of non-ferrous metals; electronic motors, generators; pumps / compressors; agricultural and forestry equipment; manufacture of machine tools; other machinery
Textile finishing/ mercerization	caustic lye of soda	Finishing of textiles
Catalysis	catalytic converters	Chemical products; mineral oil processing
Cooling	ammonia, pentane	Abattoirs and meat – processing Fish processing Manufacture of fruit and vegetable juices Wholesale in fish and meat products
Heating–heat transfer oils	e.g. isododecane	Manufacture of rubber and plastic products

UNIDO has defined the term of Chemical Leasing as follows:

UNIDO Definition of Chemical Leasing

Chemical Leasing is a service-oriented business model that shifts the focus from increasing sales volume of chemicals towards a value-added approach.

The producer mainly sells the functions performed by the chemical and functional units are the main basis for payment.

Within Chemical Leasing business models the responsibility of the producer and service provider is extended and may include the management of the entire life cycle.

Chemical Leasing is a win-win situation. It aims at increasing the efficient use of chemicals while reducing the risks of chemicals and protecting human health. It improves the economic and environmental performance of participating companies and enhances their access to new markets.

Key elements of successful Chemical Leasing business models are proper benefit sharing, high quality standards and mutual trust between participating companies.

3.1 Lessons learnt – Chemical Leasing in Mexico

In 2004, UNIDO's Cleaner Production Programme and the Austrian Ministry of the Environment with the support of the Austrian Ministry of Foreign Affairs launched the joint project "Promotion and implementation of closing-the-loops cooperation and business models in the chemical industry". The main aim of this global undertaking is to demonstrate the applicability of Chemical Leasing business models in developing countries and countries with economies in transition and to further develop and promote the concept of Chemical Leasing.

Core elements of the joint project are national capacity building and Chemical Leasing demonstration projects in selected industries. These activities are being implemented in Egypt, Mexico and the Russian Federation in close cooperation with the respective National Cleaner Production Centres. The selected NCPCs have already established good cooperation with the chemical industry and are well familiar with the problems associated with sustainable industrial development in their countries. Besides offering logistical and administrative support, the Centres deliver important information on the national chemical sector and identify local companies and other relevant stakeholders. The role of the Centres in coordinating the implementation and monitoring of Chemical Leasing Business models at the national level is extremely important.

Mexico is one of the countries that were selected for the implementation of UNIDO´s demonstration project to promote Chemical Leasing models in

the country. The implementation of Chemical Leasing projects will be exemplified below, describing the approach chosen in Mexico.

The target sector is the chemical industry, which is expected to shift their traditional business concept towards a more service and value-added approach. This is being achieved through the development of company-specific business models that implement the above indicated Chemical Leasing concept with the support from the Mexican NCPC.

The Mexican NCPC was established in December 1995 in the Instituto Politécnico Nacional (IPN). The mission of the Centre concentrates on providing assistance to national companies in order to improve their productivity and competitiveness and to facilitate market access. The Centre has been carrying out more than 100 projects in different sectors, with particular focus on the chemical industry sector.

The Mexican chemicals sector is highly developed and contributes to 17–20 % of the national GDP. The oil industries, including the basic petrochemical industry, the synthetic polymers production and the production of several chemical compounds, are currently providing the highest contribution to the GDP. The manufacturing sector provides the highest contribution to this number, especially cosmetic production companies.

The implementation of Chemical Leasing business models in Mexico was intended to demonstrate the ability of these models to reduce emissions of contaminants from companies of the chemical industry sector.

The strategy for implementing Chemical Leasing business models in Mexico was to bring together, with the support from the Mexican NCPC, supplier and user of chemicals to form a so-called tandem. In order to achieve this goal, three different approaches have been adopted:

1. As a first step, UNIDO's current and past Cleaner Production projects in Mexico were analyzed in order to identify suitable users of chemicals. Subsequently, the suppliers of chemicals of the identified users were approached and invited to implement Chemical Leasing models by building a tandem with the user. In case the supplier was not interested in implementing the Leasing model, the Mexican NCPC facilitated the involvement of other suitable suppliers.
2. The second approach followed by the project was to contact major producers and providers of chemicals and secure their commitment to apply the new business model. The NCPC then supported suppliers willing to participate in the project in finding interested users as partners to form the above mentioned tandem.
3. The third approach focused on providers of equipment that had already gained experience with the implementation of Chemical Leasing models. In this case, the Chemicals Leasing model does not follow the tandem strategy and is implemented with more than two partners. The NCPC facilitated the identification of appropriate producers and users of chemicals.

Due to its well-established contacts to the Mexican chemical industry sector and its knowledge of the problems associated to sustainable industrial development, the Mexican NCPC was able to provide vital background information on the chemical industry sector and its main stakeholders and to assist in recruiting national experts in the Chemicals Leasing field.

Following an internal training on Chemical Leasing business models of the Mexican NCPC staff itself, a training combined with in-plant activities was organized to promote and start the implementation of the Chemical Leasing concept in companies. Furthermore, the project involved other key stakeholders, such as industry associations and research institutions. The selection of the participating chemical companies followed the above-mentioned approaches.

About twenty companies from the Mexican chemical industry sector have been targeted to implement Chemical Leasing business models. With the support from the Mexican NCPC, the following tandems between a supplier and a user of chemicals could be established:

- A contract for Chemical Leasing was signed between a company from the electroplating sector and a provider of chemicals. The aim of the implementation of Chemical Leasing was to decrease chemicals consumption, in particular the consumption of nickel and of brighteners. The existing process was optimized and first evaluation results showed that the consumption of nickel could be reduced by 25% by replacing the metal partly with iron. Furthermore, economic advantages are expected to be obtained by both partners, as first evaluation revealed possible annual savings in the range of US$ 2,000 to US$ 3,000. However, with an ongoing process optimization there is still a potential to further reduce the nickel input to 225 kg/year.

- Within the sugar refining sector, a sugar mill and a producer of lubricants agreed to realize Chemical Leasing for lubricants. Experts of the lubricant producer visited the plant in order to identify reduction potentials for lubricants. Tender documents for Chemical Leasing were prepared. The discussed process optimizations included a change of existing lubricants to synthetic lubricants; the reduction of possible losses of lubricants; the optimization of intervals to change lubricants; and the recycling of used lubricants.

The implementation of Chemical Leasing in Mexico has proven to be an efficient instrument in enhancing sustainable chemical management and significantly reducing emissions in Mexico. It is a shift from the traditional focus of chemical industry on increasing sales towards a more service-oriented one, bringing a win-win situation for economy and environment.

Several companies from the chemical industrial sector implement or agreed to implement Chemical Leasing business models. Moreover, the successful implementation of Chemical Leasing in Mexican companies raised the awareness of other companies from the Mexican chemicals sector with regard to Chemical Leasing. Based on the positive findings of the project, several Mexican companies now started to negotiate contents of possible Chemical Leasing contracts with suitable business partners. In cases

where the Chemical Leasing approach was not followed, the project fostered the implementation of internal closing the loop strategies, which resulted in a significant reduction of the consumption of chemicals.

3.2 Further activities

Not only in Mexico companies have successfully implemented Chemical Leasing business models but also in Russia and Egypt pilot projects have been started.
In Egypt, case studies on Electrostatic Powder Coating, Hot Dip Galvanisation and Cleaning Equipment with Hydrocarbon Solvent have been started, involving well known companies like ABB, Akzo Nobel and General Motors. In Russia, Chemical. Leasing has been applied on Water Purification with Henkel -ERA being one of the parnters.

More about these case studies can be read in the book “Chemical Leasing Goes Global”, which was published by UNIDO together with the Ministry of Environment of Austria. This book collects the experience gained from the pilot projects in Austria, Egypt, Mexico and Russia. The book contains detailed description and evaluations based on existing projects, as well as political and scientific interpretations and analysis.

Much effort has been put in elaborating the Chemical Leasing guidelines and worksheets which aim at enabling a systematic approach to the implementation of Chemical Leasing business models at company level. This has been done in close cooperation with the national and international experts involved in the UNIDO project “Promotion and implementation of Closing-the-Loops cooperation and business models in the chemical industry” that started in 2004. The experience obtained in Egypt, Mexico and Russia presents the basis for this instrument, which is expected to be applied by the entire UNIDO Cleaner Production network.

The guidelines and worksheets cover the main steps to be undertaken to ensure smooth and efficient application of Chemical Leasing to industries from different sectors and countries. Starting from a detailed market analysis and screening process to define the most suitable sectors and companies in a country, these tools provide support on the implementation and monitoring of Chemical Leasing business models at plant level.

To globally promote Chemical Leasing and develop ways of implementation an international multi-stakeholder working group has been established in 2005. In this group, national administrations, technical inspection agencies, industry, the consultant sector and UNIDO are represented and meetings are held 1-3 times a year.

4 Overall conclusion

Experience has shown that Chemical Leasing and Cleaner Production support sustainable chemicals management, respond to the changes in chemical policies and help to achieve the objectives of the voluntary international accord SAICM (Strategic Approach to International Chemicals Management). The key elements of successful Chemical Leasing implementation involve process optimization as a consequence of more intensive cooperation of supplier and users of chemicals, enhanced environmentally sound technology development and transfer, greening of the supply chain and capacity building, and clearly result in sound chemicals management at plant level.

Promoting Chemical Leasing based on the preventive Cleaner Production concept provides practical solutions for industry to become more efficient and at the same time reduce unnecessary hazardous chemicals consumption and protect human health and the environment. In this way, environmental and economic policy matters as well as international cooperation objectives can be addressed.

To conclude, combining Cleaner Production and Chemical Leasing has proven to be a win-win approach for the economy and the environment. It can be applied to industries of different sizes in developing countries and countries with economies in transition and fosters sustainable industrial development and the implementation of international chemical policies.

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United Nations Industrial Development Organization – Cleaner Production Programme, www.unido.org/cp

United Nations Industrial Development Organization – Chemical Leasing, www.bipro.de/_clhome/index.htm

Policy (1)

Chapter 8 The Challenges and Possibilities of National Sustainable Consumption and Production Programmes

Discussing the strategic uses of broad policy programmes in the field of SCP

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(This article is work in progress. Draft version 7.2.2008)

1 Introduction

Sustainable consumption and production (SCP) is a broad field of environmental governance that has emerged particularly after Johannesburg World Summit on Sustainable Development in 2002. In Johannesburg, countries agreed to promote the development of a 10-year framework of programmes in support of regional and national SCP initiatives. (Johannesburg Plan of Implementation, 2002, Chapter III, art. 14–19) Some forerunning countries have already drawn up their national SCP programmes. In this paper, the aim is to discuss the potential challenges and opportunities of the SCP field by taking a look at two national pioneers, Finland and UK. What I am interested in is the way *how broad-ranging policy programmes could be best used to combat SCP related challenge*s. On my way to address this broader theme, I'm trying to answer are the following sub-questions[1]:

- How are the pioneering programmes of Finland and UK? What kind of policy tools they propose? What themes and actors they focus on?
- How experts evaluate the challenges and possibilities that the pioneering SCP programmes need to face (case UK)?
- What kind of challenges and possibilities are met in a deliberative policy process on SCP (case Finland)?

Why I have wanted to discuss the pioneering SCP programmes? The first reason is that – citing the Johannesburg Plan of Implementation (2002, art.

[1] The analysis is partly inspired by the work of Niestroy (2005) who analyses national strategies towards sustainable development and the impact of councils in nine EU member states from the following angles: actors and processes; themes and scope; relation to the EU SDS and other international strategies; successes and shortcomings.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

14) – "[f]undamental changes in the way societies produce and consume are indispensable for achieving global sustainable development". As SCP can be seen to be a newly framed political attempt to address the problem it is interesting to understand its potential to bring about change. Moreover, as it is a "framework of programmes" that was agreed in Johannesburg WSSD, my aim is also to gain better understanding about the dynamics of programme-led politics in fields such as SCP. When holistic, broad-ranging policy programmes are made what kind of possibilities arise for combating the problem? And what kind of challenges need to be addressed?

In the next chapter (2), I will tell a bit more about national SCP programmes and especially about those of Finland and UK. Moreover, the contents of the case programmes are analysed by looking at the focuses and important actors as well as policy tools presented. Chapter (3) continues to discuss the context, dynamics and actors of the pioneering SCP programmes through the case of UK. Meanwhile, chapter (4) deals with the Finnish case where the national SCP programme was negotiated in a deliberative setting. Finally, chapter (5) summarizes some of the main findings of this paper and also develops them further. The idea is that it could be worthwhile to consider the different use opportunities a SCP programme or process might provide for different actors. As the broad SCP programmes do not implement themselves someone needs to find them worthwhile, use them as a reference, allocate resources for realising the agreed actions and wait for a political momentum to push the more controversial issues further.

2 Analyzing programmes on sustainable consumption and production

2.1 National SCP programmes and their background

As national programmes on sustainable consumption and production stand at the core of this paper, it is worthwhile to provide a bit more background to them. The concept of *sustainable consumption and production* has been on the international agenda since the early 1990s. However, practical tools and methods for implementation are only now evolving. The Rio Summit [2] represented a watershed in international community's way of thinking on environment and the focus of environmental policy was shifted from the mere production to consumption and production[3]. In Johannesburg Summit[4], the development and promotion of a 10-year framework of programmes (10YFP) was agreed. The actions outlined included for example the development of policy tools and measures,

[2] The United Nations Conference on Environment and Development (UNCED) 1992

[3] For example Manoochehri (2002, 48) interprets that Chapter 4 of Agenda 21, entitled 'Changing Consumption Patterns', is a mandate for altering production and consumption patterns. Further, Fuchs and Lorek (2005, 264) point out that sustainable consumption was firmly established on the global governance agenda in the course of the United Nations Conference on Environment and Development (UNCED) in 1992.

[4] World Summit of Sustainable Development (WSSD) (2002)

awareness-raising programmes, monitoring mechanisms and technology transfer.

Progress in developing the 10YFP is taking place on international, regional and national levels. The Johannesburg Plan of Implementation (2002, paragraph 14) defines the division of work between developed and developing countries as follows: "All countries should promote sustainable consumption and production patterns, with the developed countries taking the lead and with all countries benefiting from the process - -." For the moment, more than twenty countries have developed or are developing national SCP programmes. These include Sweden, France, Czech Republic, Hungary, Finland, Belgium and UK in Europe; Ethiopia and Mauritius in Africa; Jamaica and Argentina in Latin America and Caribbean; and Japan, Thailand and Indonesia in Asia and the Pacific. (3rd International Expert Meeting on 10 Year Framework of Programmes on SCP, 2007, 25)

In the context of the international SCP process it has been presented that a national SCP programme is a tool for informed decision making that provides a framework for systemic thought across sectors. It can help to institutionalise resource allocation, monitoring, consultation, negotiation and consensus building on priority societal issues where interests differ. Thus, the current situation with some pioneering SCP programmes at place is a clear step forward. In 2002, UNEPs Tracking Progress study found out that of the 52 countries surveyed not one employed an integrated approach to SCP (ibid., 22, 29). Meanwhile, the international SCP process is heading towards the 2010 and 2011 meetings of the UN Commission on Sustainable Development where a proposal for a 10YFP will be presented and reviewed. (Commission on Sustainable Development, 2003)

What then is a *programme*? Owen & Rogers (1999, 24) define that a programme has two essential components: a documented plan and action consistent with the information contained in the plan. One sector of policy research that has been interested in programmes is the programme theory or intervention theory branch of evaluation studies. In those studies the idea is to describe how a policy programme or intervention is supposed to work. The knowledge about this "programme theory" is then used in the evaluation work. (Mickwitz, 2006, 32) In general, however, in-depth discussions around dynamics and strategies of broad programme-led political processes seem to be scarce. At least in the field of sustainable consumption and production, the documents that deal with SCP programmes seem to reflect a rather straightforward view of good governance.

An excellent example of this is the material produced by UNEP to develop guidelines and indicators for national SCP programmes. In the project overview, UNEP (2007) presents four key principles for SCP programmes and a 10 step model for an ongoing development process. The key principles include initiating a multi-stakeholder process that maximises the participatory nature of programme development and implementation. Secondly, defining objectives, targets and indicators is found important for the accountability of the process as well as for demonstrating its achievement. The third principle is that an SCP programme should be

integrated with existing national strategies so that it would not simply constitute an on-off initiative to produce a document. On the other hand, according to the fourth principle, also sectoral action plans could be developed and linked to a framework as that can be a more efficient means to tackle SCP for some countries, at least in the short term. The 10 step model is presented in the Box 1 below.

Box 1: 10 steps for an ongoing development process of SCP programmes (UNEP 2007)

1. Establish Advisory Group
2. Conduct Scoping Review
3. Set Institutional Framework
4. Select Priority Areas
5. Define Objectives & Set Targets
6. Select Policies & Instruments
7. Official Approval of Programme
8. Implement Programme
9. Document, Monitor & Evaluate
10. Sustain & Improve

While listing the elements that an SCP programme or process should include works as a useful checklist, it falls a bit short in answering the question what should be done if you cannot get it all. Is a multi-stakeholder process always good if it produces only watered-down compromises? Can integration with existing strategies and new sectoral action plans mean just more paperwork? How much effort should be put for defining the objectives and targets if the commitment is not there yet? The idea is that broad-ranging policy processes such as those on SCP might have diverse dynamics of their own. While UNEP's ongoing development process model notices also the need for flexibility, it might be interesting to study where exactly fruitful paths might be found outside the 10 steps presented here.

For example Niestroy (2005, 11) has pointed out that national sustainable development strategies – that could perhaps be seen as rather close counterparts to SCP programmes – have a strong "governance dimension". This means that the *processes* themselves need most attention. Niestroy highlights that SD strategies cannot be implemented like a plan but they need flexible approaches that enable also learning. In addition, the governance angle emphasizes also the role of non-state actors in policy processes. Could it be that for example the 10 step model is a bit too state-centered compared to the importance of non-governmental actors in SCP processes? These questions will be further discussed in the following as I will analyse the SCP policy cases from Finland and UK.

2.2 Taking a closer look at two pioneers – Finland and UK

2.2.1 Finland: Getting more and better form less

"Meeting the long-term challenges of sustainability is not possible with today's levels of technology. More progressive technologies are needed, together with new types of services and other innovations that increase energy- and material efficiency."
- Getting more and better from less (2005, 18)

In Finland, the preparation process for a national programme to promote sustainable consumption and production began in November 2003 and it was concluded in June 2005. The task was to "prepare for the Council of State a proposal for a programme on ecologically, socially and economically sustainable manners of production and consumption" (Ympäristöministeriö 2003). The process was lead by the Ministry of the Environment (MoE) and the Ministry of Trade and Industry (MTI). A committee was set up to do the job.

The making of the programme was *broadly participative*. During the one and a half years of work, there were 38 persons who participated to the work either as committee or secretary members or as permanent experts. In addition, almost 50 specialists contributed to the work in the hearings or working groups. The members represented various ministries but also other stakeholders of the SCP field such as business and industry, labour unions, environmental organizations and research institutes. (Kestävän kulutuksen ja tuotannon toimikunta 2005; Nikula 2006)

The finalised paper '*Getting more and better from less – Proposals for Finland's national programme to promote sustainable consumption and production*' was unanimously accepted in June 2005. In the year 2006, the programme was approved as an integrated part of the National Sustainable Development Strategy. The SCP programme includes a vision until the year 2025 as well as goals and action points for 11 fields that were considered important in promoting SCP. The paper introduces in total *93 proposals for new action*. Some examples about the proposals are establishing a material efficiency service centre, defining long-term policy guidelines to reshape the taxation system and initiating material- and energy efficiency dialogues.

2.2.2 UK: Changing Patterns & One Planet Economy

"The UK government is determined to take a lead in tackling these damaging impacts. Our actions, at home and abroad, must strengthen the synergies between our economic, environmental and social agendas."
- Changing Patterns (2003, 3)

The SCP programme of UK consists of two parts. First there is '*Changing Patterns* – UK Government Framework for Sustainable Consumption and Production' that was co-published by the Department of

Trade and Industry (DTI)[5] and the Department for Environment, Food and Rural Affairs (Defra) in 2003. Changing Patterns is – as its name already reveals – a *framework*. It contains background text about the scientific, political and market context where the SCP policy takes place and informs the reader about the UK government's SCP relevant action under way. The politically most important part of the paper is the Next Steps chapter where some 20 proposals for action are put forward.

The second part of UK's SCP programme consists of the sustainable consumption and production chapter '*One Planet Economy*' of the *UK Sustainable Development Strategy* (2005). While Changing Patterns is more like a report of the government on SCP, the preparation process of the SDS included substantial input from different stakeholders. The consultation took place in 2004 and a wide range of consultation mechanisms were especially designed and used to engage with stakeholders at all levels (Government's Sustainable Development Unit, 2004).

However, despite the emphasis on participative preparation process, the level of novel proposals in One Planet Economy is lower than in Changing Patterns. It presents some 12 proposals that on the basis of reading the strategy text can be interpreted as clearly new. In total, among the new provisions of UK's SCP programme are for example Sustainable Consumption and Production Business Task Force, a new Sustainable Design Forum, and a proposal to develop a Trade Union Sustainability Strategy.

2.2.3 Focuses, key actors and policy tools in the SCP programmes of Finland and UK

For the first sight, the SCP programmes of Finland and UK resemble each other in many ways. One of the clearest similarities is the common adoption of *principles* such as life-cycle thinking, co-operation with the market, stakeholder participation and the use of different policy tools. In addition, the both programmes share the view that *mobility, housing and food* are the three biggest contributors to unsustainable patterns of consumption.

When reading the SCP programmes, it is easy to see that both Finland and UK have many *innovative provisions*. On the other hand, they also seem to have many weaknesses in common. As regards social sustainability, Finland is clearly more socially sensitive than UK but the angle remains rather weak in both programmes. The most severe problem in common is, however, the *level of concreteness*. Particularly the programme of Finland lacks timetables and priorities and also the new proposals of UK fall short of specifying who is going to do what, when and with which resources. Thus, we can notice that the steps 4 and 5 (of UNEP's 10 steps model presented

[5] On 28 June 2007, the DTI of UK was reformed to Department for Business, Enterprise and Regulatory Reform (BERR). In this article, however, I will still use the old term DTI as it was still valid during the publication of the two parts of the SCP programme and during the time of my interviews.

above in Box 1) on selecting priority areas, defining objectives and setting targets have not been fully fulfilled. This can be seen to be due to the fact that SCP is a rather new field. Still, more concrete programmes would have had better changes to be well implemented.

If the programmes are looked at a bit more closely it can be seen that they differ in focus: whereas Finland's SCP programme emphasises research and broad deliberation the programme of UK focuses on business. It speaks clear language about government's leadership but in realising this task business stands as a close co-operation partner. A summary of the most important themes and actors in the SCP programmes is presented in the Table 1 below.

Table 1: The main focuses and most important actors in the programmes of Finland and UK.

Countries	*The main focus of the programme*	*The most important actors in making the programme*	*The most important actors in implementing the programme*
Finland	Research and technology; broad deliberation	The preparation committee with members from ministries and stakeholder groups	Different ministries but also a wide range of stakeholders
UK	Economy and business	Government but also widely consulted stakeholders	Government and business

The variety and shares of different policy tools proposed in the programmes was found out by categorising them. For the purpose, I used the fivefold typology by Jordan & al. (eds., 2003). It includes: (1) regulatory instruments, (2) market-based instruments (MBIs), (3) voluntary agreements (VAs), (4) informational devices and (5) institutional arrangements. It is important to notice that when making the analysis I have classified some policy proposals to more than one category if they have contained elements of many policy tools. For example, proposals for studies on ecological tax reform have been categorised both as MBIs and informational devices.

In general, the most popular categories of the analysis turned out to be MBIs, VAs and informational devices. The category of MBIs comprises of all the political promotion of SCP by using market mechanism as a tool. It includes a broad scale of instruments from congestion charges to public procurement of clean technologies. Meanwhile, as VAs have been categorised tools that use voluntary schemes and cooperation as the means to effect change. Some examples about the tools of this category include recommendations for environmental standards at workplace and promotion of regional co-operation in planning. Moreover, informational devices refer to production and delivery of information as means to make change. Under this category belong R&D projects, promotion of ecological labelling and standards as well as environmental education.

As research material served the proposals for new SCP related action provided in the programmes[6]. In Finland there were 93 new proposals and in UK 32 (20 in Changing Patterns and 12 in One Planet Economy). A summary of the results of the policy tools' analysis is presented in the Table 2 below.

Table 2: A summary of the results of the policy tools' analysis: The total number of new proposals in each SCP programme and the quantitative and percentage shares of different policy tool categories.

Country	*Proposals*	*Regulation*	*MBIs*	*VAs*	*Informational devices*	*Institutional arr.*	*Other/ No tools*
Finland	%	0	25	17	47	2	25
	93	0	23	16	44	2	23
UK	%	6	22	9	16	9	38
	32	2	7	3	5	3	12

MBIs = market-based instruments; VAs=voluntary agreements

When analysing the policy tools, it soon became clear that *informational devices* were popular. In the programme of Finland, nearly a half of the proposals contained at least one reference to informational devices. In the case of UK, the percentage share was 16 %. This result is rather well in line with the earlier notion that the programme of Finland values research and deliberation as means to strive towards more sustainable consumption and production. In both cases, production and dissemination of information are needed.

Also *market-based instruments* were popular. For example in the Finnish SCP programme a quarter of the policy tools dealt with MBIs. In UK, the market related instruments were almost as popular as in Finland and their share was 22 %. In fact, MBIs were the most popular group of policy instruments in the SCP programme of UK. This also completes well the earlier observation that business and economy stand at the core of the UK strategy. On the other hand, Finland beats UK when it comes to VAs as in Finland their share is 17 % and in UK 9 %.

In the end, one of the most surprising results of the policy tool analysis was that among Finland's 93 SCP related proposals, there was not even one proposal for traditional *governmental regulation*. In the case of UK, the situation was not much different with two proposals for regulation. Even though it is difficult to find clear answer to the absence of the regulation from the programmes, the following quote might explain the general ambient: " - - although Government regulation has a clear and vital role to play in ensuring that markets operate efficiently excessive and unnecessary

[6] The number of proposals that were categorised could not been directly seen from the programmes. For example in the case of Finland, 93 proposals for new action could be found from the list of 73 action points.

regulation can obstruct efficient functioning of the market." (Changing Patterns 2003, 24)

3 Discussing challenges and possibilities of a pioneering SCP programme – case UK

While the chapter above asked how the pioneering programmes of Finland and UK are, in this chapter the aim is to take a closer look at a field where the SCP programmes operate. The question is: How experts evaluate the challenges and possibilities that the pioneering SCP programme need to face? And how they assess the possibilities of the programme to combat the challenges and grasp the opportunities? These questions are considered by taking a closer look at the case of UK.

3.1 About the research material and the methodology

The first insights into the state and dynamics of the SCP field in UK were got by conducting seven thematic interviews in London and in the surrounding areas on June 11th–15th 2007. The group consisted of government officials, academics as well as industry and NGO representatives. The interviewees were chosen partly by the recommendation of one of the key government officials working on SCP, partly by an applied snowball method of asking from the experts themselves who they would recommend.

The group is not big enough to cover all the possible perspectives to the issue. On the other hand, the experts interviewed had mainly long experience with the SCP related questions and they had, thus, good insights as regards the field. Of the seven interviewees, four had worked with sustainable consumption and production issues for ten years or more, two had been involved in the discussion from the beginning of this decade and only one was really new in the field – but still in a powerful position.

The interviews dealt basically with the following two themes: (1) the SCP programme of UK, its making and implementation; and (2) the general situation of sustainable consumption and production in the UK and the dynamics of the policy field. The interviews took on average one hour 15 minutes and they were taped. In addition, notes were taken during the interviews and typed up shortly afterwards. The thematic analysis presented here is preliminary and – for the moment – based only on the written up notes of the interviews. Thus, it gives only a rough picture of their contents.

3.2 Assessing the SCP programme of UK

What kind on themes stood up in the interviews? Something that seemed to loom behind the answers of many interviewees was the idea that SCP constitutes a *big challenge* to the society. It was seen that there is a long way

to go and that addressing the *consumption* end of SCP is a particularly tricky part of the whole.

Moreover, in some of the interviews the international dimension of SCP was acknowledged and it was seen that the agreement in *Johannesburg* WSSD in 2002 had pushed the concept on the national political agenda. How *well-developed* the SCP programme of UK was then seen to be? In this respect, the views were a bit split: Particularly one of the interviewees was strongly of the opinion that there is no SCP programme in UK yet. Meanwhile, there were others who thought that there is a programme but that it might contain rather early stuff. The third way of looking at the situation was that the programme was seen to be in such a state that it could already be evaluated against the SCP indicators prepared by the UK government.

When it came to assessing the approach of the programme, the opinions were more concensual: The thinking was seen to be strong, the challenge well-reported and the view was that the programme understands the problem in general. Of the two SCP programme documents discussed, *One Planet Economy*, the chapter of the UK sustainable development strategy, received more feed-back than the framework programme Changing Patterns. The SDS chapter was told, for example, to be more concrete and particularly useful.

On the other hand, the opinions differed a bit when it was discussed whether or not the SCP agenda *has been proceeding*. Many acknowledged, for example, that Defra's work on sustainable products had been taken forward. In addition, there was the longer tradition of addressing production-related problems. As a more challenging topic remained, however, the field of consumer behavior.

3.2.1 Important aspects and dynamics of the SCP field in UK

As a policy field, SCP was compared particularly to two other fields, *climate politics* and the politics on *sustainable development*. In this context, the opinion expressed in many of the interviews was that SCP is more meaningful and focused than SD. It was seen that SCP attaches extra focus on the essence of SD, business and economics, and that it is thus a complementary element to the general sustainable development paradigm. On the other hand, in comparison to climate politics, it was seen that the political motivation and impetus behind SCP is not that strong. Although it is difficult to say what effect the carbon hype will have on the SCP agenda, the prediction was that in the future SCP will be taken much more seriously than it is taken still today.

In this context, it was pointed out that in UK politicians find it hard to interfere with the *consumer sovereignty*. The unsustainable trends are taken note of but not reacted to. Moreover, consumers are not pushed to cut on their consumption and the essence of SCP is seen to be merely the idea of consuming differently. One reason for this could be that there is no proper understanding about consumption behavior since the sociological and

psychological aspects are not incorporated into the picture well enough. On the other hand, a couple of experts also claimed that the chances of *regulation* have been neglected in the SCP field – a view that would also get support from the policy tool analysis presented earlier in this paper. Thus, there might be the need for good regulation, particularly if it is gaining more popularity as proposed by one of the interviewees.

While it was claimed in the interviews that taxes and regulation will bring about the change, one of the experts pointed out that the strategy of getting the prices right has its limits. The charges might not help if the *infrastructure* is not there. Still, for many *economy* was the hard core of the SCP agenda. In this context some saw that growth is the biggest worry. Thus, decoupling should be one of the most central issues in any SCP programme. A big question is, however, whether the government will ever limit the trade or whether SCP needs to be mostly about innovation and smart technology.

3.2.2 Actors and their roles

As regards economy, there was a broad consensus among the interviewees that *business* is a key player in making sustainable consumption and production real. As the emphasis on business was also a central theme in the national programme, the business-orientation seemes to be a really popular idea in the SCP field of UK. The view presented in many of the interviews was that work on SCP should be conducted “upstream” where government would negotiate with business. While there would be the thread of regulation at place, industry would prefer voluntary agreements.

On the other hand, at least one of the experts pointed out that voluntary agreements do not always deliver and that good regulation would be very powerful instead. Still, there were also many who felt that government is for the moment concentrating too much on what should be done. It would be better to *set a vision* and a goal as business needs to manage difficult changes all the time. Already now business is doing a lot with the retail sector leading the attitude change. This might make government think it does not have to bother. But how far the business actors are willing to go?

When it came to the role of different actors, the importance of *leaders* was frequently taken up. In a couple of interviews it was highlighted how David Miliband, who during the time of the interviews was Secretary of State for Defra, had been talking about “one planet living”, a concept with a clear reference to sustainable consumption and production. As Stern report had made climate policy a hot topic in UK, it was thought that something similar should be done also for SCP. Leadership should be about creating visions and setting “impossible” long-term goals, and the popular roundtables were seen as tools to get leaders onboard. Would it be possible to have the Prime Minister to lead the SCP process one day?

If the idea about the importance of leadership was a commonly shared opinion, the role of *broader public* in SCP was seen in a much more controversial light. Some thought that it would be important to get people

involved. In this context some emphasized, however, that while households should do their share as regards for example recycling, government should edit the consumption choices upstream. It was pointed out that consumer demand alone will not deliver change except in some cases such as the case of organic food. An important question remains however whether people should have the right to be informed about the impact of their consumption choices regardless of its effectiveness. A political programme needs aboard both business and social consensus.

In general, in both dealing with business and in editing consumer choices *government* is needed. The big question is then whether the government has resources to really act in this central role. While only a half of the experts took up this question on resources, those who commented on them were generally of the opinion that compared to for example climate politics SCP agenda is not having the same resources. Thus, more political commitment and money would be needed.

In terms of resources, the *Treasury* of UK plays a central role. There were, however, doubts among the interviewees whether SCP has managed to climb to the agenda of the Treasury – at least in the same manner as climate change has. While the SCP theme has somewhat affected the institutional structures of *Defra*, DTI has been less useful in the field according to many of the interviewees. One of the reasons given was that *DTI* – nowadays BERR – is neither having that long history in the field nor the resources. Moreover, it was pointed out by some that it might be difficult to act as all the data to meet the SCP challenge might not be there yet. More information would be needed as regards for example the consumption field. Still, the SCP evidence base programme for UK is having a comparatively small share of Defra's research budget.

3.2.3 Summing up the challenges and possibilities of the SCP programme of UK

To conclude, the rather widely shared idea as regards the state of art of SCP policies was that some good steps have already been taken. Within the government it is particularly Defra that has been realizing the SCP agenda by conducting research projects, making institutional changes and pioneering projects with certain product groups. Moreover, SCP has also got some degree of high-level commitments. Business is starting to react. There seems to be a good spirit in the field.

Still, compared to for example climate change, leadership, vision and resources are missing from SCP. Addressing consumption is seen to be problematic due to many reasons: On one hand, there is the principal reluctance to interfere with consumer sovereignty. On the other hand, consumer demand alone has not shown to be an efficient means to deliver change. Thus, more information would be needed as regards how to affect consumption. At the same time, attitudes could be changed towards good regulation. As economy is seen to be at the core of the SCP agenda, it affects the society as a whole. Not only business is needed aboard but also

the broader public, and not only Defra but also DTI and Treasury as the challenge of SCP is a huge one.

How does the analysis presented in this chapter communicate with the general understanding of SCP processes as expressed for example in UNEP's (2007) 10 steps model for developing an SCP programme? One of the differences seems to be that while step 6 in the model deals with selecting policies and instruments, interviewees did not put that much weight on that but emphasized more the previous step 5 of defining objectives and setting targets. It was thought that if there is just the goal, particularly business can find its way.

On the other hand, the 10 step model remains silent about two things that the interviewees highlighted: the importance of *leadership* and *resources*. While targeting budgetary priorities and getting along high level of political commitment were mentioned in the Stockholm Conference materials on SCP programme guidelines (3rd International Expert Meeting on 10 Year Framework of Programmes on SCP, 2007, 23), particularly the point on leadership might be worth reconsideration. It might namely mean commitment of other influential persons than the politicians and high officials currently in power. The important role of Al Gore in climate politics demonstrates this point very well. Who would act as "Gore" for sustainable consumption and production? That might be a more important question for the fate of the SCP agenda than the question whether or not there are ministerial signatures under national SCP programmes.

4 Discussing a deliberative policy process on SCP – case Finland

The case of UK presented above dealt with the issue of how experts evaluated the challenges and possibilities a pioneering SCP programme faces. The second case presented in this paper is about Finland and its deliberative policy process on SCP. The idea is to gain more understanding about the dynamics of political negotiation on SCP. The preparation process of the Finnish SCP programme has been studied by interviewing the people involved in the committee work. As a framework, I have used deliberative policy process analysis based on the ideas of Maarten Hajer (2003; 2005).

4.1 About the research material and the methodology

Hajer (2005) has stated that today's world is full of situations where decisions are made in networks marked by *unclear rules* as to how to arrive to a legitimate decision. The mere participation to a network often does not lead to authentic exchange of views. Thus, if we want to know what a policy process is all about we need to look closer at the practices, mediations and languages of the situations where participation takes place. (Hajer, 2003, 179–190) With *deliberation*, Hajer (2005, 450) refers to the *democratic quality* of a discussion. According to him, deliberation can be analysed by focusing attention to several points of the process. On that basis, I have listed

the following dimensions of deliberation that could be taken into account in the actual analysis:

- Access
- Exchange
- Learning
- Commitment

In the policy making process of Finland's SCP committee, deliberation took place in a network of 38 stakeholders. My aim is to take a close look at this process and its context and – in that way – try to understand its dynamics. I have conducted *20 interviews* with the members of the SCP committee, its secretariat and permanent experts in the beginning of the year 2007. The choice of the interviewees was made by using the expertise of the ministry representative who had been leading the policy making process behind the SCP programme. The attempt was to interview a balanced group of different stakeholders and ministry representatives.

The interviews dealt mainly with the same themes as those conducted in the UK – the SCP programme and process as well as the general SCP related politics of Finland. Also the practicalities of the interviews were more or less similar in both Finland and UK: the discussions were taped but also meticulous notes were taken and typed up shortly after the interviews. The plan is to make full transcriptions of the interviews and to analyse them. Until now, however, only a *preliminary analysis* has been made on the basis of the interview notes.

4.2 Dimensions of deliberation in the SCP process

4.2.1 Inclusive and open access

With inclusiveness, Hajer (2005, 450) means that in debates it is required that *stakeholders are made a part* of the argumentative exchange. Meanwhile, with openness it is emphasized that the way in which the debate is staged and conducted must *avoid unnecessary barriers*. With the term access, I have referred to the both of these qualities.

As regards access in the SCP committee, the story most commonly told in the interviews regarded its work as *inclusive and open*. However, the members with affiliations to the *social sector* saw that their branch was poorly present. While there were three representatives from environmental NGOs, there was not a single representative from for example welfare or health organizations.

Although the distribution of power varied among the members, everybody had their chance to speak out. According to the interviewees, there were no unnecessary barriers related to for example knowledge or language that would have hindered the participation. Different thing was, however, what kind of consequences the speak acts of different players had. It was generally assumed that the comments of some of the members such as those from the Ministry of Finance had *more weight* than those of some

others. Therefore the mere balanced access should not be regarded as the balance of power.

4.2.2 Weak reciprocity of exchange

While inclusiveness and openness were generally perceived qualities of the SCP process, reciprocity was not seen to be at that high level. Reciprocity means that discussions must be conducted through an argumentative exchange, *hearing both sides*, and responding to one another's arguments. To assess the quality of deliberation, Hajer (2005, 450) emphasizes also the meaning of integrity. Integrity underlines the importance of honesty and *avoidance of double play* in a debate. Both reciprocity and integrity can be seen as qualities of exchange.

As regards reciprocity, many noted the following problem: The discussions in the committee too often involved performative repetitions where different *players remained behind the old front lines*. As many of the committee members had worked with the questions related to sustainable development for years or even tens of years, they were familiar with the people and arguments of different organizations. In addition, they also knew the basics of the sustainability debate. Therefore, it was easy for them to shut their ears and concentrate on defending their position.

However, the interviews also revealed that at some points the opinions of many players were surprisingly close to each other. For example, the global challenge of sustainable consumption and production as well as many of the principles such as eco-efficiency were perceived in rather consistent ways. When talking about these *less-politicized* themes, it seemed that the people also got encouraged to speak about their own thoughts and worries that necessarily were not things they were bringing up in official discussions. Even if these personal opinions were heterogenic, too, they also revealed new chances for finding common ground.

4.2.3 Learning through dialogue

Hajer (ibid.) writes about learning that it should happen through an iterative process in which *knowledge is mobilized and enriched through confrontation* with a variety of stakeholders and experts. When the interviewees were asked about learning, the answers varied to some extent. Many thought that *they had learned at least something*, usually something from outside their own core expertise. For many it was, however, difficult to remember or point out what it was they had exactly learned. When specified, the learned thing could be related to many aspects of the SCP committee's working. For some, the learning experiences were related to the process while others felt they had learned most about the participating organizations or about the SCP topic itself.

A difficult question here is what should be the *value given to learning* in the work of the SCP committee. How big importance should be attached merely to it? As in many interviews the value of the process was emphasized

more than its result, what would have happened even without the outcome, the SCP programme itself? And if learning should be seen as one of the main results, how it could be enhanced? To take a step further from the current setting: Would it be better to invite the stakeholders to learn and not to make a programme if that is not the point? And would the participants be motivated for a mere educative process?

4.2.4 Passive commitments

Hajer (2005, 450) defines accountability in a policy processes by stating that "those involved are *accountable to political bodies and to the public* at large, also with regard to the degree to which the rules as laid out have been guaranteed". In the focused interviews, I asked about making commitments and that is also the concept used in the framework for analysis developed above. In both cases – in making commitments and being accountable – the question is about taking responsibilities in a policy process.

Most of the interviewees reacted positively to the question on whether they and their organization *can be committed* to the SCP programme. What some of them added a bit surprisingly was that they could easily be committed to it because "it was not very dangerous". This can be interpreted to reflect the fact that as such the programme was not seen to take many things further and that the real work to make things happen was still ahead. In addition, it gives strength to the earlier notion that some of the actors had actually joined the process with the aim of slowing it down. Therefore, committing to the programme *did not mean taking too big responsibilities.*

In Finland's SCP programme, the responsibilities for implementation were not only given to governmental agencies but also to organizations outside the government. However, many actors *did not recall* the responsibilities they were given. In addition, many saw that in the implementation their role would mainly be to participate - should the government initiate something. In this sense, the perception about their role in implementation was *not very pro-active* but rather one of a watchdog.

4.2.5 Summing up the challenges and possibilities of Finland's deliberative policy processes on SCP

To sum up the results of the analysis, access as the first step was seen to be *open and inclusive*. Broad access, chances for learning, as well as the whole roundtable method of conducting the process, were generally perceived in positive terms. On the other hand, reciprocity and *integrity of exchange* were criticized as the discussions often had to do more with the performative repetition of old arguments than really responding to the viewpoints of the others. It is possible to see these two results as the different sides of the same coin. As so many contradicting opinions and established interests were gathered around the same table, the more radical proposals got easily blocked. It is difficult to realize the deliberative idea of transforming pre-given opinions into new preferences (Benhabib, 1996) in this kind of setting.

In general I think the syndrome the Finnish deliberative process on SCP suffered from could be called for *politics of lowest common denominator*. What I mean with that is a bunch of problems that appeared when consensus is sought in a broadly-based group with dissenting opinions and conflicting interests. Even though this kind of practice might bring the opinions of conservative and progressive forces closer, this achievement will not be attained without a price. Among the sacrificed things might be the capability to propose something substantial, the interesting features that could be offered for media as well as weak signals that are important in visioning the future.

If we start with the *weak signals*, why are they lost? The reason is that in national committees such as the Finnish SCP committee representatives of for example industry organizations are already representing the lowest common denominators of their sector. Thus, the small entrepreneurs with new environmentally sound business ideas might be outdone by the big business interests already in their own peer group. Their voice will not be heard in the deliberations. However, the future makers might arise just from these marginal positions. Therefore, it would be important for a policy programme to be able to find and support these weak signals, as well.

In big organizations, it is difficult to seek redefinitions to policies frequently or with a hasty pace. This may lead the representatives to repeat same positions regardless of for example a piece of new information. It might be possible to correct this problem by for example gathering a similar SCP committee or a shadow-committee that would represent the *younger generation*. In addition, it could also be worthwhile to make a first draft of a programme with a more limited group or in close co-operation with the best experts of the field. Moreover, members to the committee could be invited on *personal basis*. Their knowledge and experiences would enrich the process – and perhaps even trickle down to their home organizations - but at the same time they could be allowed to truly deliberate according to the best information and arguments available. Could these kinds of arrangements make the deliberation more genuine?

However, the demand for new faces might also have consequences to the legitimacy of deliberative processes. If the senior specialists of interest organisations and governmental institutions would not be accepted as members in an SCP roundtable or a committee what would happen? And, to continue, what if also the established partner organizations of the sustainable development field would be left out? If some novel proposals could be put forward they might later on experience opposition from many powerful sectors of the society. The exclusion from the preparation process might be doomed as *illegitimate* and also the proposals could be thus negatively stigmatised. In addition, the possible learning experience that the senior experts could gain in a policy processes would be missed.

As described here, I think that the problems of politics of lowest common denominator should be taken seriously. However, I am not trying to say that a programme unanimously accepted by a broad and representative stakeholder group would not have value. A consensual proposal is a firm

basis for the future work as was also noted by the stakeholders who gave their statements to the Finnish SCP programme (Ilomäki and Hildén, 2005). It is something that can be safely referred to and relied upon. However, it could be worth considering that a broadly-based deliberative SCP process would yield three kinds of outcomes to maximise the effects: first there would be the commonly agreed things, then the parts where opinions are divided and last but not least the weak signals, new and potentially fruitful but still underdeveloped ideas that should be taken further.

On the other hand, the analysis here can also be read in a way that it disputes with the participation principle mentioned in UNEP's (2007) SCP programme guidelines. About the principle it has been said the following: "It is important that the programme development and implementation process is as participatory as possible. This includes reorienting SCP away from its traditional focus on environment to also consider economic and social issues." While this is also true, the analysis here reveals as well, that it might be better to look participation in practical terms rather than see it as having intrinsic value. Broad, consensus-oriented deliberation process easily end up having watered-down results. It might also be that enthusiastic leadership by a few pushes an agenda better forward than passive commitment of a larger group – even though in ideal situation both these elements should be at place.

5 Conclusions: enhancing strategic thinking on SCP programmes and processes

What the analysis presented in this paper has shown is the importance of understanding the deliberative dimension of policy processes. It is important to know, *how* broad SCP processes actually work. What challenges they face? How they could work better? This leads us think about the strategic uses of SCP programmes. For example enhanced learning in an SCP process could help in defining better objectives. On the other hand, firmer commitments would support more complete implementation of targets.[7] Still, the deliberative dimensions of access, exchange, learning and commitment are missing from UNEP's (2007) ten steps model.

As UNEP's SCP programme guidelines are still in progress and as there have been just brief versions of them available, the point of this paper has not been to criticize them. Rather, the 10 steps model and the four principles for SCP programmes have been used as examples of the current ideals on good governance. My idea has been to reflect these ideals against the couple of case studies I have made. For example in the UK case the expert interviewees put more weight on finding any high-level leadership than for getting an official approval for the programme. Still, in UNEP's model getting approval is mentioned but finding leadership is not. In general, in UNEP's context leadership seems to refer mostly to state actors and to "high level of political commitment" (3rd International Expert Meeting on 10 Year Framework of Programmes on SCP, 2007, 23).

[7] In UNEP's (2007) 10 steps model, step 5 included defining objectives while step 8 was about implementing the programme.

Keijo Koskinen (1995, 66) has noted that when making programmes that aim to integrate different aspects of environmental policy, it is important to understand four things*: (1) why programmes are made, (2) to whom they are made, (3) what are their goals and (4) relations to other programmes*. If you follow UNEP's SCP process model, it leads you to answer to the last two questions on goals and other programmes. However, it fails to address the question on the audience or users to whom the programme is made. Moreover, the question on why to make a programme should be answered already before starting a process. In general, the answers to these questions should shape the form of the SCP programme processes.

To make the challenges and possibilities of the SCP programmes more concrete, I have made a list of their potential *uses*. This shifts the perspective from the mere programme document more towards *actors and processes*. This is important as SCP programmes might be vague, blurry and non-binding by nature and thus someone needs to proactively use them if they are about to have any effects at all. The following list of potential uses has been made on the basis of the material presented in this paper. Some of them might seem so obvious that it feels hardly worthwhile to even mention them. However, as there are also some less apparent uses among the group it seemed appropriate to make the list at this stage as comprehensive as possible.

Box 2: Potential types of SCP programme uses

Apparent informational and political uses:
- Gathering and putting together *information*
- Locating *challenges* that require action
- Coming up with *targets, priority areas, policy instruments and indicators* to combat the challenges
- *Deliberating* on the targets, priorities, instruments, indicators and resources
- *Making political decisions*
- Bringing about *concerted action* to combat the challenge

Indirect social uses:
- Creating new opportunities for *public participation*
- Finding *new discourses* and shared ways of thinking
- Enhancing social *learning* around a topic
- Fostering *political commitment and leadership to combat the challenge*
- Creating and maintaining *social networks*

Contradictory uses:
- Creating and maintaining an *image of action* while the real action to meet the challenge is scarce
- *Inhibiting political outbursts* around the challenge by making the radical actors a part of the common project
- Taking part to a process with the aim of *blocking* it
- *Redefining commonly agreed concepts and goals* to justify action and arguments that stand in contradiction with the original understanding of these concepts and goals

A brief explanation about the groups of uses might be useful. First of all, the group of *apparent informational and political uses* contains the most obvious ideas on why to make a policy programme. The group also contains several provisions from the SCP programme guidelines by UNEP (2007). Meanwhile, the second list about *indirect social uses* deals with the potential outcomes of a deliberative process – learning and making commitments. Also the other uses listed in this group have something to do with the – potentially deliberative - policy process. The idea of using the policy process for certain purposes is perhaps most notably the viewpoint of the government. However, also an actor participating to an SCP committee work could motivate the participation by seeing it as a chance to learn, keep good contacts and meet important people. Moreover, a network once gathered around one topic might start co-operation on another, totally different subject. This is one of the reasons why these indirect uses can be useful for seeing the future potential of a programme.

Still, the last group that lists *contradictory uses* is in my opinion the potentially most interesting one. The title refers to the fact that some policy processes and programmes – and some perhaps more than the others – could be used against their publicly articulated goals. What this "articulated goal" means in different cases can, of course, be debated and understood differently by different actors. However, it is still an interesting hypothesis whether a policy process would be initiated just to make it look as if something would be happening even though the goal would be to keep the things as they are. On the other hand, it is important to notice that contradictory uses are not doomed as 'bad' here. The uses listed above could be utilised by governments or by stakeholders alike and they can be equally well beneficial or unbeneficial from the sustainability perspective, just depending on the policy case. However, it might be worthwhile to see to what degree a policy process or a programme has offered space for counteraction. For this purpose the idea about contradictory uses might be helpful.

In my Finnish interviews, one interviewee who worked for the Ministry of the Environment sighed that the administration today is "packed with programmes". Still, it seemed to her that there was no alternative to programme writing. Indeed, in cross-sectoral fields such as SCP making a broad-ranging programme seems essential. However, to be able to meet the challenges and find new possibilities for the SCP agenda, the programme processes should be used in creative and strategical ways. In this work, both the guidelines provided by UNEP (2007) and the indirect social uses discussed here might be helpful.

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Chapter 9 Policies to promote sustainable consumption patterns

A quantitative review on EU-wide policy strategies and instruments

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1 Introduction

Unsustainable consumption patterns are major causes of global environmental deterioration, including the overexploitation of renewable resources and the use of non-renewable resources with their associated environmental impacts. Since the resulting environmental risks tend to be unequally distributed, and due to their inherently relation with income distribution issues, consumption patterns may also be unsustainable in terms of social equity.

In environmental terms, the European Environmental Agency report on 'Household consumption and the environment' (EEA 2005) identifies the need areas of food and drink, housing, personal travel and mobility as well as tourism to be the four major areas of household consumption with highest negative environmental impacts.

For the fields of B2B consumption (corporate procurement) and public procurement, similar issues are relevant. This can for example be concluded from the EEA 'Signals 2004' report (EEA 2004) which identifies energy, transport and agriculture as the sectors with the largest environmental impacts in Europe – inducing in particular greenhouse gas emissions and air pollution with their related climate effects, material consumption and waste generation. As these impacts are also partly caused by unsustainable production patterns, it is difficult – and inadequate with regard to a sustainable consumption goal – to isolate the question about consumption patters from the improvement of production and design of products and services. Consumption and production are basically two sides of the same coin.

With regard to development trends, household consumption expenditure per capita in the EU-15 Member states increased approximately by one third during the last fifteen years (EEA 2005). For the future, consumption growth is expected to continue approximately at the same rate as GDP growth (2-3% annually) in the period until 2020. Technological innovations have reduced

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium. Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme

the energy and material intensity of most products. However, the increasing volumes of consumed goods have outweighed these gains: According to data in OECD (2002), energy use in OECD countries grew by 36% during fifteen years up to 2000, and is expected to grow another 35% by 2020. Household energy consumption contributes to almost 30% to the total final energy consumption and is the second most rapidly growing area of energy use after transport. Severe effects are also expected with regard to the use of natural resources including water, creation of waste, and degradation of biodiversity, as well as ecosystem functions.

Different consumption trends characterize the new East and Central European Member States. The consumption expenditure is two to three times lower (expressed in Purchasing Power Standards) than in the EU-15 but has been growing fast recently. The general public opinion considers Western lifestyles with their high consumption levels as the main indicator of a better quality of life. Therefore an essential increase in household consumption is expected in the near future in the EU+10 countries (Hossain and Jensen 2000; Juknys and Dagiliute 2006). Household electricity consumption has gradually increased from the year 1995, and a further 30% increase was registered from 1995 to 2004. Taking into account these specific trends in the EU+10, policy instruments should especially tackle the decoupling of fast consumption growth from environmental impacts.

At the international political level, it was early recognized that "the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries" (UN Agenda 21, Ch. 4). As a consequence, the topic of "Changing consumption and production patterns" became an 'overriding issue' for the UN Commission of Sustainable Development (CSD) in 1997. The World Summit for Sustainable Development in 2002 calls in its 'Plan of Implementation' (WSSD 2002) on the signatory governments to develop a national 10-year action programme to support local and regional initiatives working on implementation of sustainable consumption and production (cf. UNEP 2002). In June 2003, this agreement was concretised at an international expert meeting in Marrakech. As priorities for a framework plan such policies were identified that integrate economic, ecological and social aspects of sustainable behaviour patterns. Future strategies should contain a mix of regulations, economic incentives and communication instruments and should furthermore include partnerships between governmental bodies, international organisations, private companies etc.

At the EU level, while to date an integrated strategy on sustainable consumption is still under development[1], a commitment exists to tackle the issue as a priority (European Council 2003, EU Commission 2003), and various self-standing strategies aim at the promotion of sustainable consumption. These include the (renewed) Sustainable Development Strategy, the (renewed) Lisbon Strategy, the Sixth Environmental Action Programme, the Cardiff Process on environmental integration, the EU Consumer Policy Strategy, the Social Policy Agenda, the Corporate Social

[1] In summer/autumn 2007 a consultation process to the "Background Document to the Consultation on the Action Plans on Sustainable Consumption and Production and Sustainable Industrial Policy" was started.

Responsibility Strategy, as well as the thematic strategies on resource use, waste, and on urban environment.

How can these strategies be translated into a set of effective policy instruments and what will be the impact of these instruments in practice? This is the key question to be tackled by the approach of the POPP project[2], which will be starting shortly. Policies to promote sustainable consumption patterns (POPP) will be under research mainly within the EU Member States but also with a glance at the international debate.

Three major observations are guiding hypotheses for this research:

- A number of the sustainable consumption (SC) instruments already in place are ineffective because of contradictory framework conditions;
- A number of the SC instruments already in place are ineffective because they only focus on one phase of the consumption decision and do not take into account the everyday needs, individual routines and personal or collective "determinants" of consumption;
- The majority of instruments does not link up or harmonise the individual level of consumption, the supply side and the socio-political arena (see Eberle, Brohmann and Graulich 2004).

These hypotheses will be examined by establishing a conceptual framework which helps to describe and explain some of the key interrelations that exist between policy instruments, consumption patterns and their related sustainability impacts.

2 Factors influencing consumption

Sustainable consumption is defined as a more ecological but also socially premised way of buying and using goods and services as compared to conventional consumption decisions (Brohmann and Eberle 2006). The last decades of research on sustainable consumption have shown that steering consumption patterns through policy instruments must account for a number of limits and uncertainties. They have to take into account the different levels and arenas of decisions made by individuals in different settings. The following Figure 1 depicts the different arenas of action.

[2] Policies to promote sustainable consumption patterns (POPP) – Proposal under the 7th Framework Programme / ENV.2007.4.2.3.1: The consortium consists of five academic partners and two subcontractors. We herewith thank all our colleagues from the National Council for Consumer Research Helsinki, the University College London, the Baltic Environmental Forum, the Ecoinstitut Barcelona, ICLEI London and ISOE Frankfurt for their contribution to the final document of the Proposal.

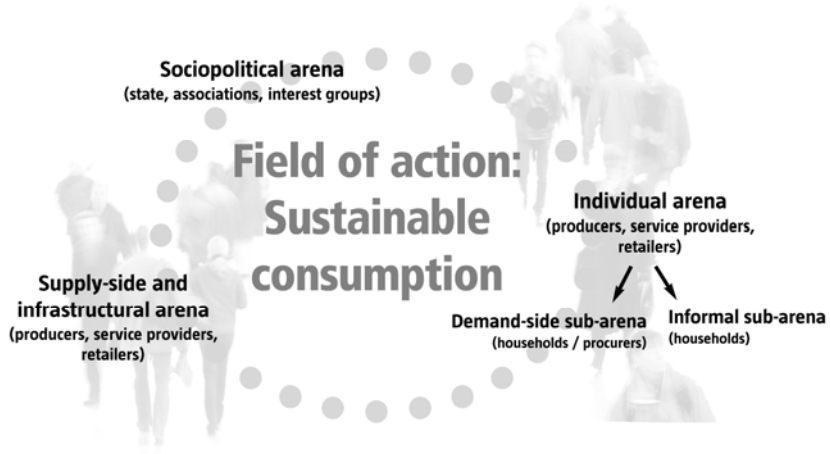

Figure 1: Field of action: Sustainable consumption (Eberle, Brohmann and Graulich 2004:8)

Individual and societal consumptive behaviour for example is embedded in daily routines and is influenced by a variety of context factors such as specific lifestyles, neighbourhood, favoured peer groups and institutional context (Bhate 2002; Shove and Warde 1998; Empacher 2003).

2.1 The individual level

Individual-level factors influence consumption decisions at the level of individual decision-takers in the phases of buying, using and discarding a product. The literature points to the following factors: awareness (e.g. Schahn and Holzer 1990); attitudes; social (including legal) norms (Shove 1997); habits and culturally acquired behaviour patterns and conventions – including issues of gender, behavioural control over and perceived effectiveness of consumption measures (e.g. Cleveland et al. 2005). Moreover, living conditions (e.g. Uusitalo 1986) and socio-economic characteristics (e.g. Lamprecht and Stamm 1994) are also relevant. Among the latter, income play a role in determining the pattern of consumption across households, the growth over time of consumption, resource use and waste generation, and the responsiveness of consumers.

Personal, individual-level factors influencing consumption differ in detail, but not systematically, from the determinants governing the consumption of corporative (collective) actors such as purchasing units of public administrations and companies. Large customers like public (or business) procurers, however, have significantly larger market power and ability to specify product characteristics, whereas the private consumers' market power is limited, their knowledge about individual products is usually less comprehensive, and they can rarely have an influence on product characteristics (i.e., order products according to their own specifications).

The upshot of this is that conditions for success or failure of sustainable consumption policies include both the design and implementation of the policies, the ways in which they influence individual-level 'determinants' of consumption and their impact on contextual framework conditions, including product design. The interrelations between these factors are dynamic and highly complex. This makes the empirical determination of the

instruments'/strategies' causal effects on consumption patterns a very challenging exercise. After SC strategies and instruments lead to changes in consumption patterns, these changes typically induce effects on sustainability, i.e. on the environment, society and economy. In environmental terms, more sustainable consumption patterns with regard to the purchasing, use and disposal of products tend to reduce material and energy throughput and to ease the burden on sink capacities. Sustainability impacts can occur both within the EU and internationally. For example, more sustainable consumption patterns within Europe may promote ecological production outside Europe. On the other hand, the use of specific SC instruments may also function as a non-tariff trade barrier for imports from outside the EU, thus reducing income opportunities elsewhere. Within the POPP project, the main focus will be on environmental impacts within the EU. However, social and economic effects and international sustainability impacts will be considered conceptually and will be analysed empirically where data availability allows.

2.2 The framework conditions

The framework conditions that generally affect consumption can be described as follows: SC instruments and strategies impact more or less successfully on consumption depending on a number of framework conditions, such as institutional setting (e.g. coherence with other policies), market structure and transparency, business strategies, product design, technologies and infrastructures (which influence the supply / availability of sustainable goods as well as their compatibility with the prevailing system of goods and technologies, e.g., Shove 2003). Moreover, because sustainability is a collective good, trust among different members in a society influences the perceived effectiveness of actions taken by individual consumers.

The design and implementation of SC instruments influence the instruments' impact on consumption patterns, by affecting more or less effectively either the individual-level determinants of consumption or the framework conditions (Charkiewicz et al. 2001, Fuchs 1995, Fuchs and Lorek 2004, Jackson and Michaelis 2003, Helm 1991, Wolff 2004). Aspects of instrument design and implementation which are generally seen to be relevant in this respect include inter alia the instrument's level of incentive or obligation and the fit of its governance mechanism with the challenges of specific consumption problems.

3 Beyond simplistic models

There is broad consensus among experts that the implementation of more sustainable consumption behaviour – i.e. behaviour focused on low environmental and resource impact – requires not only corresponding awareness among consumers, but also a change in social and economic structures. It has long been agreed on that consumption behaviour is influenced by cultural values and norms (Shove 1997). On the supply side, socio-technical systems and infrastructures play an important role (van Vliet 2002; Shove 2003).

Besides the questions of awareness and of social and economic framework conditions, less attention has been paid to the issue of how to

stimulate and consolidate sustainability changes in consumer behaviour. The ability to predict consumers' behavioural responses on the basis of favourable attitudes is relatively limited. In survey studies, attitudes rarely explain anything more but a minor share in the observed variation in behaviour. Attitude-behaviour models have not been able to fully address the social and cultural determinants of consumption. In addition to the 'advice' provided by policy instruments, there is a range of other sources of advice, including other consumers (Heiskanen 2005), fashion, advertising, etc (Autio and Wilska 2005). Family decision making compounds this equation even further.

Recent research in sustainable consumption has directed increasing criticism towards the belief in the sovereign consumer underlying many policies for sustainable consumption. There has been an emerging turn toward studying 'the consumption junction', i.e., the way in which consumption patterns are mutually shaped in markets where consumers and producers meet (e.g. Spaargaren 2003). Sustainable consumption cannot be accomplished merely by directing policy measures at consumers (e.g. Stern 1999), as their market power is often limited by a number of well-known market failures (information asymmetry, oligopolies, barriers to entry, etc.). Decades of research in household energy efficiency have also highlighted the interaction between information and financial and convenience-enhancing incentives. For example, Stern (1999) has concluded that an appropriate combination of incentive programmes with information can enable programmes to surmount the barriers to energy conserving behaviour. The most effective interventions combine information, incentives of various kinds, social influences and institutional support. Moreover, programme designers should have an understanding of the consumer's situation – for example, by engaging the target groups in participatory programme design.

Last but not least, the quantification of the integrated environmental, economic, and social effects which could be achieved with various instruments for SC is often focused on direct impacts alone, and few studies have considered applying material-flow analysis on the level of instruments for SC (e.g., Hertwich 2005).

3.1 Information and awareness raising

Consumer behaviour is hence the outcome of a number of extremely complex processes at the macro and micro levels. It is not influenced merely by policy makers, but also by a number of developments over which policy does not have full control (e.g., economic growth, changing lifestyles, technological innovation, the role of consumption in social relations, etc.). This is why consumer behaviour needs to be addressed on a broad front (e.g. Jackson 2004; Heiskanen 2005).

The limited effectiveness of general information campaigns and awareness raising has given rise to targeted information programmes and attempts to provide focused information, and information provided close to the point-of-decision. Household energy metering and feedback is one such instrument, which has proven to be very effective: in some experimental studies, merely providing feedback on energy consumption on energy bills has reduced consumption (Arvola et al. 1993), and billing feedback programmes have become increasingly sophisticated as knowledge about

consumer behaviour and technical possibilities have grown (e.g., Sernhed et al. 2003; McCalley 2003). This observation seems to confirm that the *invisibility* of the environment in everyday consumption is a major barrier. Evaluations of, for example, the Nordic Ecolabel and the EU Energy Label found that the labels do not always influence producers via a simple model in which consumers favour products designated as pro-environmental. Producers often like to use favourable labels in signalling overall quality. In a compulsory labelling system such as the energy label, producers are also motivated to improve their performance by an attempt to avoid gaining a bad reputation. Hence, labelling systems have actually often been more influential than would be predicted on the basis of consumer awareness and active consumer attention to labels (e.g. Niva et al. 1997), due to the complex market interactions.

A commonly used market based instrument that promotes sustainable consumption is that of a product certification trough the creation of mandatory or voluntary labelling schemes. The use of labelling has impacts on consumption decision making and through this on broader environmental impacts (Swallow and Sedjo 2002).

There are two fundamental pieces of information that policy makers need to obtain for the successful design and implementation of such market based labelling instruments. The first is to understand the degree to which consumer markets for a particular good are sufficiently segmented. Understanding the number of different segments that may exist for a particular product, their size (i.e. market share) and their nature (i.e. their determinants) is crucial (Kontoleon and Yabe 2006 in order to know about the impact potential of the segment as concerns its contribution to sustainability. Secondly, understanding how consumers perceive the information contained in labels is equally vital. Both of these aspects of labelling design have not been sufficiently examined for the case of sustainable consumer markets.

3.2 Economic instruments

At the consumer level, market-based instruments will primarily take the form of taxes on the sale of particular goods associated with unsustainable consumption, and possibly tax cuts or outright subsidy for ‘green’ products (e.g. Leicester 2006). Theoretical considerations indicate that such measures should be designed with care. Generally the price incentives cannot be targeted exactly at the underlying environmental concerns (Fullerton and West 2002), and it will be important to ensure systematic treatment of all relevant consumption substitutes (Wijkander 1985).

The extensive econometric literature modelling individual consumption patterns provides an increasingly-sophisticated basis for assessing the responsiveness of individual consumption to price changes. In assessing the impact of pricing measures bearing on broad categories of consumption - energy in particular - evidence from demand system models is essential if proper account is to be taken of the income effects of significant price changes (e.g. Deaton 1981).

The distributional impact (i.e. effects in relation to household incomes) of greater use of pricing measures to encourage pro-green consumption changes has been an area of concern, and is discussed, for example, by Poterba

(1991), Smith (1992), and Cornwell and Creedy (1996). Distributional issues are perhaps most acute in the case of the taxes on domestic energy, although there have also been concerns about the effects of road congestion charging and other pricing measures (Leicester 2006).

Both from a theoretical and practical point of view, however, consideration needs to be given to the use of any revenues raised from green taxes. OECD (1996) demonstrates that while additional taxes on domestic energy will tend to have a sharply-regressive distributional incidence, it is possible to devise a revenue-neutral package of measures, including higher energy taxes combined with higher transfers to poorer households. The social and distributional costs of adjustments to higher energy prices may be exacerbated if market failures in energy efficiency investment are particularly concentrated amongst low income households, or other vulnerable groups (Brechling and Smith 1994). Thus, for example, income-related market failures, such as those related to the credit market, or to housing tenure, may tend to amplify the distributional cost of reducing energy consumption through pricing instruments. Measures (such as building regulations or home energy audits) to rectify the underlying market failures would then have the twin merits that they would tend to reduce the aggregate economic cost of achieving a given reduction in consumption, and at the same time would also help to reduce the social and distributional cost of higher energy taxation.

4 Implications for instrument design, implementation and transfer

Relatively few policy instruments directly tackle consumer behaviour. The existing instruments are mostly communication-based, especially labels. Regulatory instruments to a large extent – though not exclusively – relate to producers, production processes and product design rather than to consumers, e.g. by requiring the phase-out of specific substances, or (dynamic) emission/efficiency standards, such as the Japanese Top-Runner Model.

Apart from subsidies, economic and fiscal instruments such as (eco-)taxes, resource pricing, tradable certificates, or premiums for feeding green electricity into the grid exist in some Member States, but have not been used extensively yet, despite the Marrakech call for a plurality of instrument types and policy mixes. Procedural instruments such as EMAS, Integrated Product Policy or Extended Producer Responsibility again often address the supply side, as do many societal self-regulation approaches such as Voluntary Agreements and Corporate Social Responsibility.

The effectiveness of different types of policy instruments, especially with regard to regulatory vs. economic instruments, has been researched by political science, economics and other social sciences.

However, empirical studies e.g. in the field of energy efficiency have also shown that economic incentives tend to affect consumption behaviour only in the short term (Abrahamse et al. 2005). At the same time, purely communicative instruments are often ineffective due to the so-called “Knowledge to Action Gap” (Lebel et al. 2006).

There is a need to refocus from individual ‘pro-environmental’ behaviours to a broader understanding of the drivers of sustainable and non-

sustainable consumption patterns (Shove 2003). Here, the mere analysis of consumer behaviour and attitudes is an insufficient approach: attention should be devoted to the interplay between consumers and producers, markets and institution, and technology development and everyday life. In addition, the instruments' type and design are important: does the instrument address efficiency or sufficiency? By what mechanisms does it impact on consumer behaviour, patterns of use, the demand side? Which positive sustainability effects can be achieved with the instrument, expressed in terms of quantified emission reductions, costs, and net employment gains?

Increasingly, the role of policy measures and political-institutional frameworks for the stimulation of sustainable consumption are recognised (Hobson 2004).

Research has shown that the effectiveness of policy instruments apart from their type and design are also affected by the compatibility with institutional contexts, societal norms and implementation, e.g. use of accompanying measures. Nevertheless, most of the strategies in place only focus on one of the action arenas or stakeholder groups.

The expected recommendations of the POPP project aim to surmount this restricted approach. Their elaboration will be based on the analysis of interdependencies and the evaluation of success and failure of policy instruments.

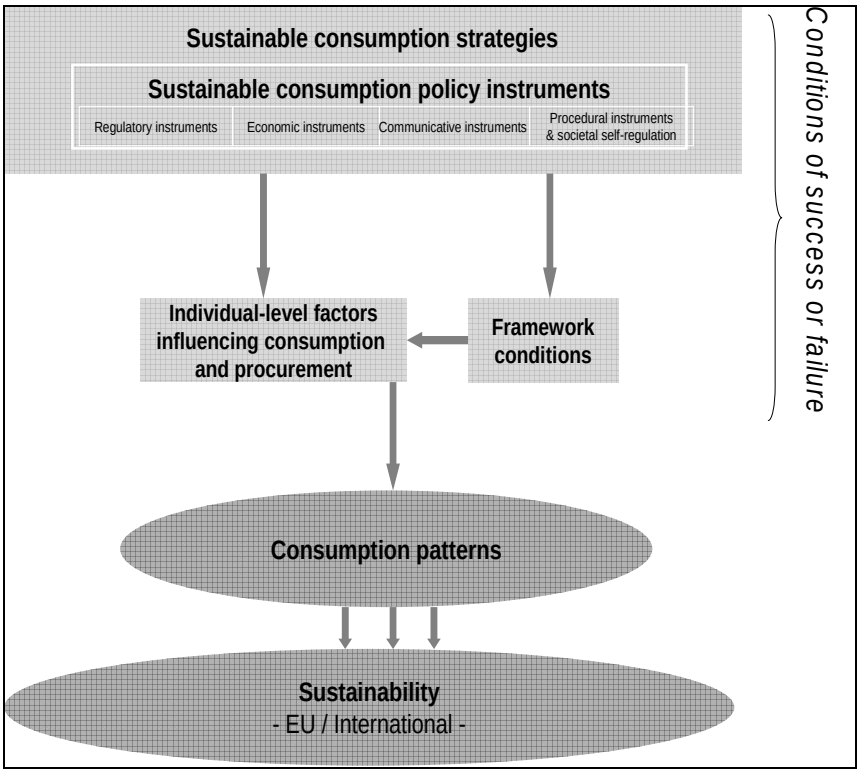

Figure 2: Relation between SC strategies/instruments, consumption patterns and sustainability (Oeko-Institut 2007)

5 Consequences for the Project design and Methodology

The project will contribute to the different scientific views by using insights from economics, psychology, sociology and technology studies. It will integrate the above insights into its *conceptual framework* which integrates the role of individual-level determinants of consumption with that of contextual framework conditions and policy design/ implementation considerations when assessing consumers' behavioural responses to policy instruments. While the conceptual framework will account for the effects of interdependencies of demand-side and supply-side conditions, the research subject is focused on strategies and instruments on the demand-side.

The POPP approach will address sustainable consumption strategies and individual policy instruments and will analyse their characteristics and their impacts on collective and individual consumption patterns in an integrated interdisciplinary manner.

Sub-questions include (inter alia): How apt is an SC strategy/instrument – through influencing different determinants of consumption as well as the framework conditions – to make consumption patterns more sustainable? What are the limits of certain policy instruments (e.g. 'soft' approaches, market-based-instruments) in fostering sustainable consumption patterns? What framework conditions might influence favourably/ negatively the consumption patterns? What are the gaps in the existing portfolio of sustainable consumption strategies and instruments and how can they be addressed?

Looking at the behavioural aspects of consumption patterns in different phases, the way *how* and *what* we consume is crucial. Consumption patterns do not only refer to individual consumers but also to procurement decision-makers in the public sector and in industry.

While it is impossible to define sustainable consumption patterns in an absolute way, the POPP approach will determine consumption patterns which are *relatively* more sustainable – namely through assessing the improvement of economic, social, and environmental performance indicators against a business-as-usual scenario.

The methodological challenges are to link the analysis of the effectiveness of sustainable consumption instruments with primary research on consumer attitudes and behaviour, thus bolstering policy analysis with new empirical findings at micro- and macro-levels and determine the relative impacts of the instruments in terms of quantified sustainability indicators (environment: emissions of greenhouse gases and air pollutants: economy: costs; social: employment), taking into account the life-cycles of SCP, including international material, energy and emission flows.

Finally new information will be generated on how to successfully design SC instruments in order to tackle the 'knowledge to action' problem.

Sustainable consumption has been recognized for quite some time as a core element for the path to sustainable development. It is not a matter any more to bring SC on the agenda. But so far, much needs to be done to make it a reliable and effective pillar of sustainable development. Thus, the project will not only aim to develop methodology or to gain knowledge on consumption patterns and how they can be influenced by policy. It will also go beyond the assessment of sustainability effects of current SC policies.

The overarching goal is to synthesize the research results and to derive concrete recommendations for decision makers, and to contribute to the ongoing discussions on international, European and national levels on how to make SC policies work better.

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Chapter 10 Sustainable consumption and production: how do we get there?

Environmental NGOs' views on stimulating SCP through policy

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1 Introduction

Despite more than 15 years on the international political agenda, since featuring as one of the chapters in the 1992 Rio Summit's outcomes known as Agenda 21, the issue of sustainable consumption and production (SCP) has mostly been ignored by governments. Similarly, despite individual sustainability issues coming to the fore since Rio, most notably climate change, attempts at mitigating further environmental and human damage have been undertaken but completely away from the context of SCP. Somehow, this agenda issue failed to gain political importance or recognition. Only since the 2002 World Summit on Sustainable Development in Johannesburg, have national governments begun to put the issue on the political agenda. The Johannesburg Plan of Implementation, as with Rio's Agenda 21, includes a chapter on changing unsustainable patterns of consumption and production, this time proposing governments to produce 10-year national programmes on SCP by 2010.

Sustainable consumption and production, although general in theory, can be seen as a middle-level policy issue, linking on the one hand horizontal policy such as sustainable development with more specific policies on waste, energy, chemicals, etc.; and on the other hand, addressing *behavioural* issues and putting the general and specific policies into a societal perspective. Thus, SCP is a means of better cementing sustainable development goals into policy areas, and into societal institutions. Particularly at a time of increased global awareness of our human-induced impacts and the natural limits we are hitting or have long over-run, SCP can potentially provide the focus needed to get (notably, Western) societies to engage with our unsustainable behaviour. Beyond addressing improvements in production *processes*, SCP provides the opportunity for discussions on the *needs* for some of these processes, weighing a product or product function or characteristic against its environmental and/or human health impacts.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium. Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

It is widely recognised that Western societies live beyond their ecological limits[1], so one key objective of the SCP agenda needs to be to bring these societies back within ecological limits. Only in this way can we reduce pressure on nature's systems while allowing under-developed countries to have a fair share of resources for their development.

This article places a particular focus on the European Union's (EU) contribution to the United Nations' (UN) 'Marrakech Process' on SCP. This is for two reasons: firstly, and practically, the European Environmental Bureau has a European focus and therefore limits itself to the political grouping called the European Union; and secondly, Europe, of all the 'Western' regions or countries in the world, has more systematically gone further than any other Western regions in developing sustainable development policies including specific issue policies (e.g. chemicals, air pollution, water management, etc.). The potential of EU-level activity on SCP, therefore will have a tremendous impact on the momentum of the Marrakech Process and on the global effect of decisions it takes within this policy agenda. For this reason, a visionary and ambitious policy needs to be set.

The EU's contribution to the Marrakech Process thus far is the development of an SCP 'Action Plan', still in preparation in early 2008. The Action Plan, and any developments stemming from it, must act as the drivers and deliverers of the system change needed to move us away from the post-WWII state of high production and high consumption as a means of maintaining and growing our economies.

This system change in the end requires a paradigm shift away from consumption and production as a means of driving our economies. Key pieces of the puzzle to effect this paradigm shift need to address what a sustainable product is (through sustainability criteria), stricter and stronger liability legislation and enforcement to ensure 'responsible' behaviour from producers, advertising messages communicating sustainable behaviour, sustainable (addressing environmental and social elements) price signals/market prices and an economic system based on a qualitative, rather than a quantitative, approach.

2 Sustainable Consumption and Production – what does this involve?

Chapter III of the Johannesburg Plan of Implementation sets out activities on some key issues, not all of which would form a comprehensive approach to SCP. The measures detailed in the Chapter can help to set minimum-level activities to support an international SCP agenda, but Europe's contribution will need to go further. The Chapter includes activities relating to:

[1] Various studies illustrate how Western societies live beyond their ecological limits, the most well-known including the Global Footprint Network's *World Footprint* (http://www.footprintnetwork.org/); *WWF's The Living Planet Report 2006 (http://assets.panda.org/downloads/living_planet_report.pdf).*

- Measures that help the general *and accelerated* shift to more sustainable patterns of consumption and production – from policies, to monitoring and assessment mechanisms including indicators and lifecycle analysis, to applying the polluter pays principle, and to information provision tools including advertising.
- Eco-efficiency and cleaner production – technological advancement, take-up, financial support, and activities relating specifically to SMEs
- Integrating SCP into sustainable development policies, programmes and strategies
- Integrating SCP into public decision-making – support for such integration, and public procurement policies
- Energy for sustainable development – better integration into decision-making, dissemination of less damaging technologies and practices, financial support for cleaner energy and elimination of environmentally damaging subsidies
- Transport – sustainable transport strategies, financial support structures
- Waste minimisation – waste management systems prioritising prevention and minimisation, reuse and recycling, and promotion of reusable consumer goods and biodegradable products, and infrastructure required for these
- Chemicals –a strategic approach to chemicals management, ratification and implementation of various international chemicals/hazardous substances agreements, global classification and labelling of chemicals, environmentally sound management of chemicals and hazardous waste, information provision, and preventing illegal trafficking

At UN level, the list illustrates the level of maturity of some areas of policy and therefore the level of detail gone into, most notably on energy and on means of technology and knowledge transfer between more developed and less developed countries. In other areas, particularly relating to sustainable consumption policies and chemicals, activities are much less detailed and less numerous. Unfortunately, and surprisingly, natural resources issues receive only superficial treatment.

Rightfully, the EU has taken a positive, proactive decision to make a contribution at this supra-national level (of the 27 European Union Member States). In this way, formal discussion on SCP takes place within EU decision-making structures, and a 'European' vision of SCP is more likely to develop. Also, the important links to the EU Sustainable Development Strategy and to more specific policy areas are made easier by the development of an EU SCP approach. At the national level, individual EU governments, not all of which have produced their SCP programme, can also follow in the steps taken at EU level which makes for easier harmonisation of approaches.

3 Where is Europe now?

Skipping over the years since the Johannesburg Summit, the European Commission is currently finalising its Sustainable Consumption and Production Action Plan (SCPAP). Unsurprisingly, the nature of the SCPAP has evolved since work was begun on its contents. Rather than come out with a full-blown Plan linking existing policies and reducing or eliminating gaps by proposing new mechanisms, the European Commission is meant to have focused on the reinforcement of existing mechanisms, strengthening synergies and making the mechanisms stronger in themselves.

In particular, the SCPAP will feature proposals for the revisions of the European Ecolabel and the Eco-Management and Audit Scheme (EMAS), key EU mechanisms making obvious contributions to sustainable consumption and production before this policy agenda existed. The Plan is also meant to include a Communication on Green Public Procurement, and signals on the extension of the current Ecodesign of Energy-using-Products Directive to non-energy-using products, and on the introduction of a European version of the Japanese Top Runner Programme.

Before we consider these in more detail, the SCPAP needs to be put into a wider political and policy context. Firstly, in the Western context, the concept of sustainable consumption and production is naturally controversial. Given Europe's above-average levels of affluence and disposable income, from a global perspective, and the consistent messages received on ecosystem decline, over-use of resources, worsening climate change, etc., there is general recognition that our consumption patterns are fundamentally unsustainable. However, no public debate has been organised to consider how Western consumption patterns can be made more sustainable. Indeed, the Commission's presentation of the consumption-related activities in the background document to a consultation in 2007 was under the heading 'Smarter Consumption'. Smarter consumption, through purchasing more efficient, less environmentally damaging products, implies relative reduction in environmental impacts through efficiency gains. However, another school of thought exists which considers more sustainable consumption patterns requiring *less* consumption, giving an absolute reduction in environmental impacts. This will be considered in more detail in the section 'What more is needed?'.

Sustainable production is much easier to address since it builds upon existing environmental policy, and the concept of reduction of environmental impact is therefore more embedded and developed than sustainable consumption. However, sustainable production is still a general enough a term that in itself it is not clear what activities would deliver any objectives set. The SCPAP consultation background document of 2007 identified a small number of activity areas addressing production. These were: 'Better Products', 'Leaner, Cleaner Production', 'Leveraging Innovation' and 'Global Markets'. Admittedly, the background document was prepared for the consultation on the SCP and another area of policy – Sustainable Industrial Policy (SIP). SIP and its development also affects SCP from a wider policy context.

The EU's Sustainable Industrial Policy (SIP) Action Plan (SIPAP) is meant to be published alongside the SCPAP, potentially confusing due to an unclear delineation between these Action Plans in the area of sustainable production. According to DG Enterprise's mid-term review of industrial policy, "The main thrust is to … lead the transition towards a low carbon and resource efficient economy. It will thus contribute to reaching the objectives of the energy and climate change package … ." The three basic principles of SIP are: to stimulate development and commercialisation of low carbon and energy efficient technologies, products and services; to create a dynamic internal market, through a strong product policy and removal of obstacles in the internal market; and creation of global markets for low carbon and energy efficient technologies, products and services.

The development of SIP is notionally a positive step in integrating industrial and sustainable development policy, but, as with the lack of 'ideas' on sustainable consumption, it is very clear from the gaps between the general objectives of a low carbon and resource efficient society and the activities that are identified as a means of meeting these. Resource efficiency is lost in all the activities relating to energy efficiency and a low carbon economy. This comment is not meant as an attack on the SIP, rather it reflects the shorter distance travelled on the 'natural resources path' in comparison to energy efficiency or climate change related activities. These gaps are discussed further in the 'What more is needed?' section. However, before we look at some of the existing mechanisms in more detail, it needs to be said that the SIP focus on energy does not help the development of an integrated or comprehensive approach to SCP and indeed can threaten to maintain an undesirable focus on climate-related activities.

Moving on to existing mechanisms, we start with the most influential product-level one, the Eco-design of Energy-using-Products Directive (EuP). The Directive considers different products on a case-by-case basis, using lifecycle analysis as the starting point for discussion on how eco-design improvements are to be met (whether through voluntary agreements, regulation, etc.) and at what level they are to be set. These implementing measures are discussed within a multi-stakeholder Consultation Forum set-up, which has only late last year begun meeting. Implementation is in too early days to provide evidence of its effectiveness in driving eco-improvements to product design, but as a first step into product policy, the Directive's lifecycle study basis, use of stakeholder contribution for policy decisions, and case-by-case approach potentially give the flexibility needed in dealing with different products within the same regulatory framework. Of course, there are several NGO questions about effectiveness of the Directive – in achieving eco-improvements to a level that meets the needs from increasing ecological pressure, on the quality of the preparatory LCA studies, on the continued focus on energy issues, and on the level of democratic decision-making in particular on what implementing measures are proposed or agreed. We consider broader product policy in the next section.

The European Ecolabel, in existence since 1992, has long suffered derision as a 'failed' policy mechanism. EEB has been involved in the Ecolabel since it was created, and formally represents environmental NGOs

in the scheme's Board. Unfortunately, as a voluntary mechanism addressing a niche market of the notional top 25% of any product market for which an ecolabel has been created, the scheme does not have the 'teeth' to shift whole markets towards more ecological products or production. Until the creation of the EuP Directive, the Ecolabel was the only product-focused mechanism delivering a general objective of 'reduced environmental impact'. In other words, not only was it the only star in the universe, it was also located in a black hole. The double potential for the Ecolabel, through this latest Regulation revision to be presented as part of the SCP package, and its placement in a more strategic product policy picture with other Directives taking up the rear, will at last start to give it the structural support it needs.

4 What more is needed?

From the outset, it needs to be said that one of the main reasons for the Johannesburg Summit to have tried to revitalise the sustainable consumption and production agenda is similar to the focus on the Millennium Development Goals – a need to focus minds on fundamental issues given the ongoing degradation and increasingly worsening impacts of our behaviour on ecosystem services and on the lives of the majority of people on the planet.

As stated earlier, the European Union needs to be a progressive and visionary player on the SCP agenda, both within and beyond Europe. Similar to its influence on a global scale within the Kyoto Protocol context, the EU's messages on SCP can have tremendous impact on a global level, taking the debate to a more detailed level than discussions about programmes or plans. However, it is clear from developments thus far, on SIP as for SCP, that ideas are short in supply when considering sustainability from a more general consumption or production perspective. The approach taken so far continues to develop policy mechanisms in the same path as those that exist already: an ecolabel, product-based ecodesign, green public procurement.

4.1 From quantity to quality

What is sadly lacking in both the SCP and SIP agendas is the recognition of the need to create a new societal approach. One that touches our economic model, our production processes, how we organise ourselves and deliver products and services to the market, and how we consume. Fundamentally, we need to move from a *quantitative* model to a *qualitative* model. Our current quantitative model dictates that the more units sold the more profit is made, or the more money earned the better a life can be had. Studies have shown that the link between income and happiness is broken after a certain level of money is gained. That is, for every extra unit of money earned, happiness increases equally to a certain point but then reduces and indeed begins to drop. Of course, 'happiness' is a relative thing, depending on many individual factors, but it would be foolish for Western economies to continue to develop in the direction of wealth (for example, GDP or 'economic growth') increase as the prime societal objective.

The SCPAP and SIPAP on their own cannot deliver such fundamental change. However, other mechanisms in the European institutional decision-making structures can. Not least, the Lisbon Agenda must evolve away from economic growth and competitiveness to qualitative improvement of the economy and interdependence with other regions. Secondly, the current 6th Environmental Action Programme is set to end in 2010. With European elections and a new Commission to be created in 2009, this does not leave much time for reflection on the 6th Programme as part of preparation for a 7th Programme.

Such over-arching contributions will not come or form part of the thinking in the few months that remain before the publication of the SCPAP and SIPAP. However, it is hoped and assumed that development of the SCP and SIP agenda will continue in future, beyond these first packages. The following is a brief, and admittedly incomplete, list of issues needing addressing as soon as possible.

4.2 Sustainable consumption – new policy ground needs new policy approaches and tools

Sustainable consumption and production, as already stated, addresses *behavioural* issues and therefore puts related policies more directly into a societal perspective. Particularly in the Western context, sustainable consumption and production will be dominated by discussions about the *amount* we consume and not just the sustainability levels of *what* we consume – so the absolute, and not just the relative, amount. Many governmental institutions side-step or ignore the absolute reduction argument, particularly as this is an unattractive concept to some consumers and to industry. In particular, the concept of sustainable consumption can be seen as in direct conflict with the engines of our society – consumption and production. Rather than glossing over or avoiding this discussion, decision-makers would do better by engaging with society on discussions about happiness, quality of life, needs versus wants, and the role that consumption has taken in our lives in satisfying these. An increasing amount of research has been undertaken on sustainable consumption and lifestyles, in relation to potential policy approaches, but none of this is reflected in the EU's proposals thus far. Instead, 'better' consumption, price mechanisms and consumer information tools are mentioned in the background document to the 2007 consultation. Without suggesting that a directive on sustainable consumption or lifestyles is needed, there is very large scope for more visionary and ambitious agenda-setting from the EU level. The EU needs to set an agenda that engages Member States, (progressive) retailers, advertising agencies, major product manufacturers, social researchers and consumer and environmental organisations in structured debate on what future policy mechanisms are needed to address this important issue of sustainable consumption. Beyond the role of policy in driving such an agenda, such multi-stakeholder structured debate would 'bring along' the different players through the same journey, thereby more likely ensuring a better understanding of the EU objectives and their integration into business behaviour and practices than would simple legislative mechanisms.

4.3 Natural resources and chemicals

Structured discussion is needed in other areas of SCP (and, arguably, SIP), through steering group or task force structures on specific issues. Two particular areas needing immediate attention are natural resources and chemicals. These need urgent attention, because no policies currently exist that link to the EU Sustainable Development Strategy or give clear indications of how relevant objectives within the 6th Environmental Action Programme will be met.

A general natural resources efficiency target of 3% improvement per year was mentioned in the background document to the 2007 consultation, but with no explanation of how this would be achieved or measured. This is due to a more general lack of direction or inspiration from the European Commission, even following an exercise in the early 2000s on the development of a Thematic Strategy on the Sustainable Use of Natural Resources. EEB proposes a natural resources task force which would propose some sustainability criteria to help guide decision-makers in a general direction towards sustainability, with more detail being added on, for example, the top 20 most environmentally damaging resources to be addressed more immediately.

The picture for chemicals is even worse, since the Commission's background consultation document states that the SCPAP "could also address the further phasing out of hazardous substances and endangered materials from production processes and products". Although the policy debate on chemicals is still dominated by REACH and its current implementation, a forward agenda needs to be set along the same lines as the one above for natural resources. Therefore, EEB proposes a similar multi-stakeholder process to set sustainability criteria for chemicals.

4.4 Sustainable production – new policy ground needs new policy tools

On sustainable production, similar to sustainable consumption, new policy approaches are needed. The EuP Directive is an example of a new generation of policies that no longer have a production-oriented focus. There is still a need for such production-oriented policy, for example the Integrated Pollution Prevention and Control Directive (IPPC), since installation-based control is the only way to comprehensively address emissions from some more general processes. However, due to the continuing need to integrate sustainability into earlier phases of processes, such as the conception and design phases of products; and as globalisation has made supply and production chains international, a product-focused policy approach is needed to complement the historical production focus. The two immediate areas needing addressing are product policy and broader support needed beyond the EuP Directive extension, and sustainable industrial policy.

4.4.1 Extended Product Policy

The European Commission has already indicated that a 'non-EuP' mechanism (that is, a mechanism that addresses products that do not use energy or with energy consumption as the main environmental impact) will be mentioned or featured in this first SCP package. It is not yet clear whether the existing EuP Directive will be extended in scope to include 'non-EuP' products, or whether a new Directive will be presented, although the former is the most likely. In extending policy to 'non-EuP' products, the Commission proposes to create a product framework legislation, which could systematically address those products having large environmental impacts and therefore needing to have minimum performance levels set, with improvement targets and deadlines elaborated. This development is welcomed by EEB, since we have been campaigning for Product Policy legislation since the Integrated Product Policy (IPP) agenda was active in the early 2000s. As one of the members of the EuP's Consultation Forum, our contribution to discussions on different products begins with a broadening of focus away from only the energy-related impacts since our view is that eco-design incorporates issues such as natural resources, hazardous substances and end-of-life management. The 'non-EuP' mechanism will allow attention to broaden away from the climate and energy focus, and will create more knowledge on issues that are less well-defined to date, such as natural resources, chemicals, biodiversity, etc. Additionally, given that the Commission has indicated that the products with the largest environmental impacts will be addressed first, these are in the areas of transport, meat and dairy, and buildings.

Product Framework legislation is a welcome leap forward, after years of languishing in a primarily voluntary approach, and receiving little political support within the European Commission. The SCP agenda has helped to focus minds on the need to develop further product policy beyond the original proposals of IPP, and this is a positive first step in such developments. Some supplementary mechanisms are needed to provide wider context for the EuP-'non-EuP' Directive.

4.4.2 Sustainability parameters

Very much linked to the sustainability task forces on natural resources and chemicals, there is a general need to elaborate priority objectives within sustainable production, to give an overall 'direction of travel' for different players. Having a more detailed elaboration of these priority objectives, with targets where appropriate, product manufacturers, retailers and purchasers (in public authorities as well as private companies) will be able to make more informed and targeted decisions. These priority objectives can then also be better linked to more specific policy areas and elaborated in existing or new legislation. The general objectives detailed in the 6th Environmental Action Programme can already be used as the starting point for further elaboration:

- Climate change
- Nature and biodiversity
- Environment and health and quality of life

- Natural resources and waste

Development of these priority objectives needs to be done in a contained multi-stakeholder task force setting, given a clear mandate and timeframe. Such a group would also need to elaborate priorities in relation to environmental 'trade-offs', which is where an improvement in one function of a product (for example, energy efficiency) would be counter-balanced by an increased impact of another function (for example, use of a toxic substance).

4.4.3 Producer responsibility

A shift to product-focused policy, unless related objectives are set across a sector, will necessarily lead to producers having responsibility for ensuring that their products are compliant with the objectives agreed for their product category. Waste management policy and legislation for some products is already based upon the concept of producer responsibility (PR). The Producer Responsibility Principle as a policy principle can be summarised as "a concept that manufacturers and importers of products bear a degree of responsibility for the environmental impacts of their products throughout the products' lifecycles, including upstream impacts inherent in the selection of materials for the products, impacts from manufacturers' production process itself, and downstream impacts form the use and disposal of the products. Producers accept their responsibility when they design their products to minimise the lifecycle environmental impacts and when they accept legal, physical or economic responsibility for the environmental impacts that cannot be eliminated by design" [Davis, Gary 1994].

From limited experience of the implementation of EU Directives on batteries, packaging and packaging waste, end-of-life vehicles and waste electrical and electronic equipment, making producers (legally and financially, to varying degrees) responsible for the end-of-life management of their products is a very good way to sharpen focus on these issues when designing a product. End-of-life management issues pose particular difficulties for product producers, since municipal waste management decisions are not within their control. However, this is only one aspect of a product's lifecycle that producer's should be responsible for. Design for the environment includes more than just issues that relate to end-of-life management. Design, production, distribution and use aspects or phases are also important. Most importantly, 80% of a product's lifecycle environmental impacts are decided in the design phase, so much more policy focus needs to be placed at this stage. This means mainstreaming eco-design and developing understanding in relation to environmental 'trade-offs' (this links to the sustainability parameters mentioned earlier).

Giving producers clearer responsibility for the impacts of their products implies a link to environmental liability. This link needs to be explored, as it is not likely to be feasible to make producers liable to this level of detail. However, a liability link between a new technological/process/substance development and its impact (on environment and human health) would ensure better reflection on developments than is currently the case. More

reflection is needed on the elaboration of the concept of 'producer responsibility' beyond its current end-of-life management scope, on its integration into broader corporate behaviour and into specific product policy. In particular, work is needed on applying the 'safe' product approach found in the General Product Safety Directive to a sustainability context.

4.4.4 Information tools

Product information, its public availability and the use of simple communication tools, need to form a foundational element of sustainable production. Many contributions to the sustainable consumption debate turn to this issue of product information provision to the public, based upon the view developed during the first wave of 'green consumerism' of the 70s/80s when providing information was thought to help consumers make more informed, 'greener' purchasing choices. Since those days, many changes have occurred that have greatly weakened the link between product information provision and purchasing behaviour.

Amongst these changes are the greater degree of choice offered to the public, whether on toilet paper, coffee, televisions, life insurance, financial services, pensions, etc., so the time allocated to purchasing decisions, and the factors assessed in the decision-making process tend to be longer and more complicated (than simply price) on more 'important' life decisions such as pensions, life insurance, and mortgages, and shorter and more likely to be reduced to price on televisions, toothpaste, mobile phones, etc.

Additionally, decades of marketing messages communicating price, lifestyles, and creating wants (rather than satisfying needs) have conditioned the general public into thinking about these issues when making purchasing decisions. 'Green' marketing is still a niche message, and 'conventional' advertising messages either do not address sustainability issues or go against sustainability principles, for example, in promoting throw-away behaviour. Without repeating earlier points on the need for advertising to be addressed directly in the SCP package, there is a need to put product information into more realistic perspective where it concerns expectations in its ability to influence public purchasing decisions.

Where a product information element is most needed within SCP is in the links to producer knowledge of any given product's composition (in order to provide information on what is contained in a product, a producer needs to know), transparency in sharing product information publicly, potential traceability relating to endangered species components (such as for wood-based elements), and easier identification of products containing materials that are banned or treated differently under future legislation (for example, nano-materials).

Without proposing that information sheets be printed and distributed publicly for each of the millions of products available on the European market, such product information provisions in SCP would serve many functions, make market surveillance by public authorities easier, and could be made available through a product register system. Product information

communication tools already exist (e.g. Environmental Product Declarations), and many are starting to be created in a multiplicity of designs that will in the end serve to confuse consumers. In particular, labels are currently considered for public communication almost as a default in the absence of other structures or means. Getting much attention is the development of carbon footprint labels, which advance despite the carbon element not being the most important issue for some products, carbon not being the only issue of relevance, and, most importantly, despite an internationally agreed methodology for calculating a carbon footprint. It appears that the *need to communicate* is stronger than the *message to be communicated*.

Coming back to advertising, as an information tool there is much scope for the introduction of sustainability messages such as those starting to be seen in relation to CO2 emissions levels for cars. There is a direct link between advertising/marketing and efforts made by a company to sell more of its products. Within a quantitative model, advertising serves to sell more product, rather than to communicate the quality or sustainability of a product. Indeed, much advertising communicates unsustainable behaviour in its drive to achieve increased product sales. The use of marketing needs to be linked to the discussion on provision of information, and indeed recognition of advertising/marketing's negative influence on the shift from a quantitative model to a qualitative one must be made explicit.

4.5 Sustainable Industrial Policy – where does this go?

In theory, the idea of a Sustainable Industrial Policy is a positive development in creating more synergistic links between industrial policy and environmental policy. 20-30 years' experience in some areas of environmental policy has not helped to destroy the myth that environmental improvements come at the expense of profits. Indeed, our quantitative societal model does not support such thinking, so the environment will continue to be seen as a 'threat' to profits until we move to a qualitative model.

Unfortunately, SIP thinking to date is also very far away from such thinking. This is an area needing much more attention, more reflection and more ambition. This paper does not explore areas of improvement for this Action Plan, apart from initial comments on the need for this policy area to address more than just climate and energy issues, to focus on societal sustainability issues rather than on issues of competitiveness or market edge, to encourage competition based upon sustainability performance, and to link better to other environmental policy areas such as natural resources, water, waste and its prevention and recycling, chemicals, air pollution, etc. At the moment, DG Environment's thinking appears to try to place competitiveness and the Lisbon Agenda into a sustainability context, without addressing the key sustainability issues where improvements in industrial policy can make a positive contribution.

5 Overall conclusion

The EU's contribution to the UN's Marrakech Process is a key one, as one of the major 'Western' regions of the world, and the one that has gone the furthest in developing environmental programmes and policies. For this reason, it is important that the EU's Sustainable Consumption and Production Action Plan (and its 'separated at birth' sister the Sustainable Industrial Policy Action Plan) be visionary and ambitious in aim.

A fundamental re-think of our quantitative economic model is needed, particularly as it is based upon intensive production and consumption patterns. Patterns which, it is increasingly obvious and can no longer be ignored, are unsustainable. A sustainable European society is one which comes back within manageable ecological limits, which therefore implies a reduction in our consumption levels in addition to an ecological improvement in what and how we consume.

Such a paradigm shift in our behaviour, societal structures, business behaviour and economic models also requires new policy tools. Tools that can more quickly adapt to the intensity of pressure already placed on our ecosystem services, and on the changes to nature experienced through altered climate patterns, desertification, biodiversity loss, human diseases and illnesses, etc.

This first 'package' of measures to be published by the European Commission on sustainable consumption and production and on sustainable industrial policy will not provide the means to make such a paradigm shift. However, the package could make reference to this paradigm shift and propose next steps in the 'roadmap' that will end in the identification of this new paradigm.

Annex I:
Johannesburg Plan of Implementation:
Chapter III. Changing unsustainable patterns of consumption and production

14. Fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development. All countries should promote sustainable consumption and production patterns, with the developed countries taking the lead and with all countries benefiting from the process, taking into account the Rio principles, including, inter alia, the principle of common but differentiated responsibilities as set out in principle 7 of the Rio Declaration on Environment and Development. Governments, relevant international organizations, the private sector an d all major groups should play an active role in changing unsustainable consumption and production patterns. This would include the actions at all levels set out below.

15. Encourage and promote the development of a 10-year framework of programmes in support of regional and national initiatives to accelerate the shift towards sustainable consumption and production to promote social and economic development within the carrying capacity of ecosystems by addressing and, where appropriate, delinking economic growth and environmental degradation through improving efficiency and sustainability in the use of resources and production processes and reducing resource degradation, pollution and waste. All countries should take action, with developed countries taking the lead, taking into account the development needs and capabilities of developing countries, through mobilization, from all sources, of financial and technical assistance and capacity-building for developing countries. This would require actions at all levels to:

(a) Identify specific activities, tools, policies, measures and monitoring and assessment mechanisms, including, where appropriate, life-cycle analysis and national indicators for measuring progress, bearing in mind that standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries;
(b) Adopt and implement policies and measures aimed at promoting sustainable patterns of production and consumption, applying, inter alia, the polluter-pays principle described in principle 16 of the Rio Declaration on Environment and Development;
(c) Develop production and consumption policies to improve the products and services provided, while reducing environmental and health impacts, using, where appropriate, science-based approaches, such as life-cycle analysis;
(d) Develop awareness-raising programmes on the importance of sustainable production and consumption patterns, particularly among youth and the relevant segments in all countries, especially in developed countries, through, inter alia, education, public and consumer information, advertising and other media, taking into account lo cal, national and regional cultural values;
(e) Develop and adopt, where appropriate, on a voluntary basis, effective, transparent, verifiable, non-misleading and non-discriminatory consumer information tools to provide information relating to sustainable consumption and production, including human health and safety aspects. These tools should not be used as disguised trade barriers;
(f) Increase eco-efficiency, with financial support from all sources, where mutually agreed, for capacity-building, technology transfer and exchange of technology with developing countries and countries with economies in transition, in cooperation with relevant international organizations.

16. Increase investment in cleaner production and eco-efficiency in all countries through, inter alia, incentives and support schemes and policies directed at establishing appropriate regulatory, financial and legal frameworks. This would include actions at all levels to:

(a) Establish and support cleaner production programmes and centres and more efficient production methods by providing, inter alia, incentives and capacity-building to assist enterprises, especially small and medium-sized enterprises, particularly in developing countries, in improving productivity and sustainable development;
(b) Provide incentives for investment in cleaner production and eco-efficiency in all countries, such as state-financed loans, venture capital, technical assistance and

training programmes for small and medium-sized companies while avoiding trade-distorting measures inconsistent with the rules of the World Trade Organization;
(c) Collect and disseminate information on cost-effective examples in cleaner production, eco-efficiency and environmental management and promote the exchange of best practices and know-how on environmentally sound technologies between public and private institutions;
(d) (d) Provide training programmes to small and medium-sized enterprises on the use of information and communication technologies.

17. Integrate the issue of production and consumption patterns into sustainable development policies, programmes and strategies , including, where applicable, into poverty reduction strategies.

18. Enhance corporate environmental and social responsibility and accountability. This would include actions at all levels to:

(a) Encourage industry to improve social and environmental performance through voluntary initiatives, including environmental management systems, codes of conduct, certification and public reporting on environmental and social issues, taking into account such initiatives as the International Organization for Standardization standards and Global Reporting Initiative guidelines on sustainability reporting, bearing in mind principle 11 of the Rio Declaration on Environment and Development;
(b) Encourage dialogue between enterprises and the communities in which they operate and other stakeholders;
(c) Encourage financial institutions to incorporate sustainable development considerations into their decision-making processes;
(d) Develop workplace-based partnerships and programmes, including training and education programmes.

19. Encourage relevant authorities at all levels to take sustainable development considerations into account in decision-making , including on national and local development planning, investment in infrastructure, business development and public procurement. This would include actions at all levels to:

(a) Provide support for the development of sustainable development strategies and programmes, including in decision-making on investment in infrastructure and business development;
(b) Continue to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the costs of pollution, with due regard to the public interest and without distorting international trade and investment;
(c) Promote public procurement policies that encourage development and diffusion of environmentally sound goods and services;
(d) Provide capacity-building and training to assist relevant authorities with regard to the implementation of the initiatives listed in the present paragraph;
(e) Use environmental impact assessment procedures.

* * *

20. Call upon Governments as well as relevant regional and international organizations and other relevant stakeholders to implement, taking into account national and regional specificities and circumstances, the recommendations and conclusions adopted by the Commission on Sustainable Development concerning energy for sustainable development at its ninth session, including the issues and options set out below, bearing in mind that in view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. This would include actions at all levels to:

(a) Take further action to mobilize the provision of financial resources, technology transfer, capacity-building and the diffusion of environmentally sound technologies according to the recommendations and conclusions of the Commission on Sustainable Development, as contained in section A, paragraph 3, and section D, paragraph 30, o f its decision 9/1[9] on energy for sustainable development;
(b) Integrate energy considerations, including energy efficiency, affordability and accessibility, into socio-economic programmes, especially into policies of major energy-consuming sectors, and into the planning, operation and maintenance of

long-lived energy consuming infrastructures, such as the public sector, transport, industry, agriculture, urban land use, tourism and construction sectors;

(c) Develop and disseminate alternative energy technologies with the aim of giving a greater share of the energy mix to renewable energies, improving energy efficiency and greater reliance on advanced energy technologies, including cleaner fossil fuel technologies;

(d) Combine, as appropriate, the increased use of renewable energy resources, more efficient use of energy, greater reliance on advanced energy technologies, including advanced and cleaner fossil fuel technologies, and the sustainable use of traditional energy resources, which could meet the growing need for energy services in the longer term to achieve sustainable development;

(e) Diversify energy supply by developing advanced, cleaner, more efficient, affordable and cost-effective energy technologies, including fossil fuel technologies and renewable energy technologies, hydro included, and their transfer to developing countries on concessional terms as mutually agreed. With a sense of urgency, substantially increase the global share of renewable energy sources with the objective of increasing its contribution to total energy supply, recognizing the role of national and voluntary regional targets as well as initiatives, where they exist, and ensuring that energy policies are supportive to developing countries' efforts to eradicate poverty, and regularly evaluate available data to review progress to this end;

(f) Support efforts, including through provision of financial and technical assistance to developing countries, with the involvement of the private sector, to reduce flaring and venting of gas associated with crude oil production;

(g) Develop and utilize indigenous energy sources and infrastructures for various local uses and promote rural community participation, including local Agenda 21 groups, with the support of the international community, in developing and utilizing renewable energy technologies to meet their daily energy needs to find simple and local solutions;

(h) Establish domestic programmes for energy efficiency, including, as appropriate, by accelerating the deployment of energy efficiency technologies, with the necessary support of the international community;

(i) Accelerate the development, dissemination and deployment of affordable and cleaner energy efficiency and energy conservation technologies , as well as the transfer of such technologies, in particular to developing countries, on favourable terms, including on concessional and preferential terms, as mutually agreed;

(j) Recommend that international financial institutions and other agencies' policies support developing countries, as well as countries with economies in transition, in their own efforts to establish policy and regulatory frameworks which create a level playing field between the following: renewable energy, energy efficiency, advanced energy technologies, including advanced and cleaner fossil fuel technologies, and centralized, distributed and decentralized energy systems;

(k) Promote increased research and development in the field of various energy technologies, including renewable energy, energy efficiency and advanced energy technologies, including advanced and cleaner fossil fuel technologies, both nationally and through international collaboration; strengthen national and regional research an d development institutions/centres on reliable, affordable, economically viable, socially acceptable and environmentally sound energy for sustainable development;

(l) Promote networking between centres of excellence on energy for sustainable development, including regional networks, by linking competent centres on energy technologies for sustainable development that could support and promote efforts at capacity-building and technology transfer activities, particularly of developing countries , as well as serve as information clearing houses;

(m) Promote education to provide information for both men and women about available energy sources and technologies;

(n) Utilize financial instruments and mechanisms, in particular the Global Environment Facility, within its mandate, to provide financial resources to developing countries, in particular least developed countries and small island developing States, to meet their capacity needs for training, technical know-how and strengthening national institutions in reliable, affordable, economically viable, socially acceptable and environmentally sound energy, including promoting energy efficiency and conservation, renewable energy and advanced energy technologies, including advanced and cleaner fossil fuel technologies;

(o) Support efforts to improve the functioning, transparency and information about energy markets with respect to both supply and demand, with the aim of achieving greater stability and predictability, and to ensure consumer access to reliable, affordable, economically viable, socially acceptable and environmentally sound energy services;
(p) Policies to reduce market distortions would promote energy systems compatible with sustainable development through the use of improved market signals and by removing market distortions, including restructuring taxation and phasing out harmful subsidies, where they exist, to reflect their environmental impacts, with such policies taking fully into account the specific needs and conditions of developing countries, with the aim of minimizing the possible adverse impacts on their development;
(q) Take action, where appropriate, to phase out subsidies in this area that inhibit sustainable development, taking fully into account the specific conditions and different levels of development of individual countries and considering their adverse effect, particularly on developing countries;
(r) Governments are encouraged to improve the functioning of national energy markets in such a way that they support sustainable development, overcome market barriers and improve accessibility, taking fully into account that such policies should be decided by each country, and that its own characteristics and capabilities and level of development should be considered, especially as reflected in national sustainable development strategies, where they exist;
(s) Strengthen national and regional energy institutions or arrangements for enhancing regional and international cooperation o n energy for sustainable development, in particular to assist developing countries in their domestic efforts to provide reliable, affordable, economically viable, socially acceptable and environmentally sound energy services to all sections of their populations;
(t) Countries are urged to develop and implement actions within the framework of the ninth session of the Commission on Sustain able Development, including through public-private partnerships, taking into account the different circumstances of countries, based on lessons learned by Governments, international institutions and stake holders, including business and industry, in the field of access to energy, including renewable energy and energy-efficiency and advanced energy technologies, including advanced and cleaner fossil fuel technologies;
(u) Promote cooperation between international and regional institutions and bodies dealing with different aspects of energy for sustainable development within their existing mandate, bearing in mind paragraph 46 of the Programme of Action for the Further Implementation of Agenda 21, strengthening, as appropriate, regional and national activities for the promotion of education and capacity-building regarding energy for sustainable development;
(v) Strengthen and facilitate, as appropriate, regional cooperation arrangements for promoting cross-border energy trade, including the interconnection of electricity grids and oil and natural gas pipelines;
(w) Strengthen and, where appropriate, facilitate dialogue forums among regional, national and international producers and consumers of energy.

* * *

21. Promote an integrated approach to policy-making at the national, regional and local levels for transport services and systems to promote sustainable development, including policies and planning for land use, infrastructure, public transport systems and goods delivery networks, with a view to providing safe, affordable and efficient transportation, increasing energy efficiency, reducing pollution, congestion and adverse health effects and limiting urban sprawl, taking into account national priorities and circumstances. This would include actions at all levels to:

(a) Implement transport strategies for sustainable development, reflecting specific regional, national and local conditions, to improve the affordability, efficiency and convenience of transportation as well as urban air quality and health and reduce greenhouse gas emissions, including through the development of better vehicle technologies that a re more environmentally sound, affordable and socially acceptable;
(b) Promote investment and partnerships for the development of sustainable, energy efficient multi-modal transportation systems , including public mass transportation systems and better transportation systems in rural areas, with technical and financial assistance for developing countries and countries with economies in transition.

* * *

22. Prevent and minimize waste and maximize reuse, recycling and use of environmentally friendly alternative materials, with the participation of government authorities and all stakeholders, in order to minimize adverse effects on the environment and improve resource efficiency, with financial, technical and other assistance for developing countries. This would include actions at all levels to:

(a) Develop waste management systems, with the highest priority placed on waste prevention and minimization, reuse and recycling, and environmentally sound disposal facilities, including technology to recapture the energy contained in waste, and encourage small-scale waste-recycling initiatives that support urban and rural waste management and provide income-generating opportunities, with international support for developing countries;

(b) Promote waste prevention and minimization by encouraging production of reusable consumer goods and biodegradable products and developing the infrastructure required.

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23. Renew the commitment, as advanced in Agenda 21, to sound management of chemicals throughout their life cycle and of hazardous wastes for sustainable development as well as for the protection of human health and the environment, inter alia, aiming to achieve, by 2020, that chemicals are used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment, using transparent science-based risk assessment procedures and science-based risk management procedures, taking into account the precautionary approach, as set out in principle 15 of the Rio Declaration on Environment and Development, and support developing countries in strengthening their capacity for the sound management of chemicals and hazardous wastes by providing technical and financial assistance. This would include actions at all levels to:

(a) Promote the ratification and implementation of relevant international instruments on chemicals and hazardous waste, including the Rotterdam Convention on Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade[10] so that it can enter into force by 2003 and the Stockholm Convention on Persistent Organic Pollutants[11] so that it can enter into force by 2004, and encourage and improve coordination as well as supporting developing countries in their implementation;

(b) Further develop a strategic approach to international chemicals management based on the Bahia Declaration and Priorities for Action beyond 2000 of the Intergovernmental Forum on Chemical Safety[12] by 2005, and urge that the United Nations Environment Programme, the Intergovernmental Forum, other international organizations dealing with chemical management and other relevant international organizations and actors closely cooperate in this regard, as appropriate;

(c) Encourage countries to implement the new globally harmonized system for the classification and labelling of chemicals as so on as possible with a view to having the system fully operational by 2008;

(d) Encourage partnerships to promote activities aimed at enhancing environmentally sound management of chemicals and hazardous wastes, implementing multilateral environmental agreements, raising awareness of issues relating to chemicals and hazardous waste and encouraging the collection and use of additional scientific data;

(e) Promote efforts to prevent international illegal trafficking of hazardous chemicals and hazardous wastes and to prevent dam age resulting from the transboundary movement and disposal of hazardous wastes in a manner consistent with obligations under relevant international instruments, such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal;[13]

(f) Encourage development of coherent and integrated information on chemicals, such as through national pollutant release and transfer registers;

(g) Promote reduction of the risks posed by heavy metals that are harmful to human health and the environment, including through a review of relevant studies, such as the United Nations Environment Programme global assessment of mercury and its compounds.

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9 Official Records of the Economic and Social Council, 2001, Supplement No. 9 (E/2001/29), chap. I.B.
10 UNEP/FAO/PIC/CONF.5, annex III.
11 www.chem.unep.ch/sc.

12 Intergovernmental Forum on Chemical Safety, third session, Forum III final report (IFCS/Forum III/23w), annex 6.
13 Intergovernmental Forum on Chemical Safety, third session, Forum III final report (IFCS/Forum III/23w), annex 6.

Chapter 11 Policy instruments for resource efficiency

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1 Abstract

Individuals are moving an increasing amount of natural resources and surfaces in order to satisfy their needs. Strategies of policy making to promote consumption and production patterns that correspond to the idea of sustainability should consider the fact that the main reason for most of the ecological problems are connected to a resource consumption that is far beyond the planet's actual capacities. The lifestyle of the average population in industrialised countries is characterised by over consumption and thus responsible for an enormous increase of resource extraction as well as for most of ecological and social problems worldwide. The situation gets even more severe, considering the fact that this unsustainable lifestyle is copied by developing countries to a rapid and numerous extend. Thus, the question whether production and consumption is ecologically, socially and economically sound and fairly distributed, is strongly connected to the way resources are handled. The establishment of appropriate policy measures as well as the promotion of the implementation of resource productivity in companies and whole value chains are crucial in that context. Based on analyses of various research projects carried out at the Wuppertal Institute, this paper will provide a future strategy on effective resource policy, based on instruments that establish incentives on a macro- and meso level as well as such that follow a cross-company approach. As the management of natural resources gave national and international politics a challenging character it is crucial to identify problematic areas of resource use as well as potentials for resource efficiency that go beyond current trends – as the paper will show.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

2 Challenges regarding resource consumption

2.1 Global tendencies

The problems connected to increasing consumption levels and intensified production processes are due to globalisation tendencies spread all over the planet. It results in raised resource extractions which brings the planet out of equilibrium, ecologically and socially (Schmidt-Bleek 2007). Over consumption regarding energy and resources causes phenomena like climate change, soil acidification, reduction of biodiversity because the amount of resources extracted, wastes disposed, pollutants and toxins emitted, exceed the carrying capacities of ecological systems many times over. Responsible action need to consider systemic interdependencies between the subsystems of a planet, so must even all political strategies that want to approach the main reason for environmental degradation – the global excessive energy and resource consumption (Schmidt-Bleek 2007; Jäger 2007; Liedtke / Welfens 2008). The unsustainable lifestyles of industrialised countries are expanding rapidly in a global perspective. The enormous exploitation of resources is though mostly caused by countries that are ruling the economical structures globally but are at the same time hardly directly effected by their actions' consequences, neither environmentally nor socially. Low transportation costs and liberalised trading markets made outsourcing processes of production plants and processes into developing countries profitable. Thus, the political responsibility for setting the frame for a change towards sustainable consumption and production via a "resource efficiency revolution", is up to the industrialised countries (Seiler-Hausmann et al., 2004, Weizsäcker et al., 1997). This demand gains even more importance since population-rich transition countries like China and India are adapting consumption and production patterns of the western countries. As the consumer class in those nations is increasing rapidly and reaching the standards of the social global consumer class, a significant change away from such patterns need to be realised since the planets capacities are not capable to respond to such an additional demand for resources. The main areas of need are characterised by unsustainable patterns concerning the handling of resource consumption (housing, mobility, food, etc.) (EIPRO 2006). This development is accelerating since new goods and technical services are demanded in an ever increasing pace (BMU; Roland Berger 2007).

2.2 International political attempts

The world community agreed in September 2002 at the WSSD to "accelerate the shift towards sustainable consumption and production to promote social and economic development within the carrying capacity of ecosystems by addressing and, where appropriate, de-linking economic growth and environmental degradation through improving efficiency and sustainability in the use of resources and production processes and reducing resource degradation, pollution and waste." (Johannesburg Plan of implementation, chapter III, paragraph 15). It has been emphasised that only a sound ecosphere permits to operate economically and to uphold all service structures needed and / or wanted. Thus, the protection of it has to be communicated as primary objective in social and political discourses

because the base for business is nature, which needs to keep being "operative" in order to keep it running (see: ec.europa.eu/enterprise/environment/sip.pdf). If problems like resource scarcity and negative environmental impacts won't be handled in a fair way for all members of the world community, a reduction of services would follow and consequently lead to social conflicts regarding remaining resources. The problem of inequity concerning resource distribution need to be framed into international policy strategies, including aspects of inter- and intra-generational justice (see even: www.un.org/millenniumgoals).

Decoupling economic growth and resource consumption along with an approach to change production and consumption patterns that lead consequently to an absolute reduction of resource input, should be the visioning orientation for all political decisions (Baedeker et al. 2005; Baedeker et al. 2006; Baedeker et al. 2007). The sustainable design of the demand side, increase in efficiency, life cycle approaches, function instead of product orientation are parts of such an overall approach (Irrek and Kristof, 2008; ; Stiftung Forum für Verantwortung et al., 2007; Schmidt-Bleek, 1994; Schmidt-Bleek, Tischner 1995, Stahel, 2006). The requirements for such policy frames need to respond to different conditions because experiences with political efforts regarding environmental issues vary internationally. Further more the conditions within the nations differ, evidently. Therefore one concept applied for all could never succeed, thus modifiable policy strategies are needed, offering flexibility.

3 Policies for Resource efficiency

Besides being a necessity, resource efficiency provides the possibility to strengthen competitiveness for companies as well as for entire national economies due to its strong call for innovations. Resource efficiency measures contribute to achieve win-win-situations by creating lucrative markets for environmental goods and services, stimulation of innovation and thus supporting competitiveness even on a national level (GTZ et al, 2006; BMU; Berger, 2007; Onischka and Liedtke, 2008). Thus the promotion of resource efficiency as a political strategy should be understood as a chance for all social stakeholders, companies should understand this as a possibility to establish an innovative profile, besides contributing to environmental protection (Bahn-Walkowiak et al, 2007; Kristof et al , 2006).

Research design

The question how to respond conceptually to the demand of flexible policy strategies, meaning to create a respectively fitting policy mix, is quite complex. Politicians can choose between a wide range of policy instruments for improving resource efficiency. But far only a few instruments are known that explicitly support an increase of resource productivity. However, even established (environmental) instruments might have a positive effect on the regulation of resource input. Thus, existing instruments need to be analysed precisely regarding their effects on resource efficiency. They offer the base for any further development of instruments and should be adapted to requirements of a policy for resource efficiency. Studies that refer to innovation processes and actual influences of stakeholders / institutions and their possible contribution to sustainable development, are relevant for that discussion. Another, quite recent assumption concerning the debate on

appropriate instruments for a better implementation of sustainability is to focus on dialogue structures, the development of knowledge to operate and the fixation in contracts. Difficulties concerning the development of appropriate instruments arise from the fact that different important perspectives need to be included. The interests of stakeholders in reducing material costs and to ensure the supply with raw material on the one side and – on the other side - the perspective of public welfare that intends to reduce of negative environmental impacts for all, need to be combined. New bindings / connections between stakeholders with dynamic effects need to be established (ADL / WI / ISI, 2005).

The German Federal Ministry for Education and Research started in 2006 a project called "resource productivity as key strategy of sustainable development" aiming at showing possibilities of framing economical action in a way that resource productivity could increase significantly (see even: www.ressourcenproduktivitaet.de/1/index.php?main=8&call=Projektergebnisse). A major part of this project was the analysis and development of incentive structures and instruments that intend an increase of resource productivity. Considered were mostly approaches that include instruments and institutions, acting beyond a company's boundaries but even those located on the macro economic level. Such approaches can be understood as part of governance structures that interfere with political action in that context. Even their integration into EU- or international policy frames succeeds more easily. The defined screen, this comprehensive analysis was based on, contained the following parts:

- short description,
- context,
- objectives and functionality,
- expected or actual effects

As a result they respectively point out weak and strong aspects. A similar analysis screen was used by the joined project of GTZ, CSCP and Wuppertal Institute in 2006. This instead was based on instruments that had already proved to be successful to increase resource efficiency.

The instruments described here are based on a theoretical understanding of policy that is called co-evolutionary, meaning that resource policy cannot only be developed out of the interaction of different official stakeholders like ministries, administration but need to include even private stakeholders into the interaction within different stages of the policy cycle. Politics need to include a) impulses for the stimulation of improvement potentials like diffusion of best-practice examples, the support for the implementation of best-fitting technology as well as for future markets, b) the change of policy frames in order to enable markets to develop innovative products, technologies and services (Bahn-Walkowiak et al, 2007; Kristof et al, 2006). Instruments relevant for that context arise from being rewarding or penalising, motivating or supporting.

In order to verify the possibilities for action of stakeholders from politics and business and to understand possibilities for interaction and synergies between different levels and stakeholders, instruments that refer either to a macro economic level (3.1) are described, followed by those focussing the micro economic level with a cross company approach (3.2.). The assumptions expressed below, are taken from studies undertaken in 2007 at the Wuppertal institute.

3.1 Incentives on a meso and macro level

The analysis of incentives that intend to increase resource productivity shows the following results (Bahn-Walkowiak et al, 2007:18ff):

- Incentive instrument to increase resource productivity do exist, even though they were originally not designed for that purpose. All instruments analysed in that study address the input of natural resources (minerals, fossil energy sources for electric power generation, building material, insulants, materials for vehicle construction) – but to a different extend. That means basically that the new policy field "resource productivity" does not require the design of a new "type" of instruments but rather the modification existing ones and adaptation to resource efficiency.
- Specific sectoral policy approaches (meso level of production sectors) instead, are existing partially. There are for example incentives for the sectors of energy supply, coal mining, vehicle construction and disposal. Wheras key sectors like building / housing, metal processing, etc. are neither part of instrument development to improve their resource productivity neither are sectoral actionsplans existing as they are intended within the resource strategy.
- The analysed instruments cover the whole spectrum of incentive instruments, excluding restraints. All types of instruments effect even the micro economic level, especially companies of commercial economy. Parts of the discussion concerning instruments, apastrophise a dominance of economical incentives (Wicke 1993, Marggraf and Streb, 1997). This statement was differentiated in the analysis:
  - Economical instruments seem often diluted politically, meaning that they stay behind their actual capacities (EEA 2006);
  - Regulatory instruments offer flexibility and profitability to a high extend, meaning that they keep a high potential for further development;
  - Instruments that are promoting innovations and those orientated on information are combinable with both kinds of instruments;
  - Relatively new in environmental policy are such instruments that induce innovations and generate knowledge (including informative approaches)
- Instruments show interdependencies, they have their best effect applied in a policy mix. One instrument cannot be sufficient for regarding the complexity of the problem but even concerning the various target groups. In order to respond to the variety of stakeholders and participant included in that process, only an interaction of instruments and measures makes sense.

The analysed effects on resource productivity in Germany are summarised as following, grouped analog to groups of material. The estimation of effects is done according to a theory of Grossekettler (1996, 548), differentiating between direction of impulses as well as their intensity.

Fossil fuels, especially mineral oil, were considered sufficiently so there is no need for innovations on the level of instruments regarding the direction of impulses. Instead there is an urgent need for strengthening the existing

impulses, a model that includes interactions between climate, energy and resource policy and that comprise for example approaches for energy and raw material intensive industries.

Metals and building materials are instead only registered indirectly and all in all quite scanty too. Successes concerning an increase of resource productivity in the past are almost completely due exogenous factors, like the boom in building sector or the prices in the metal industry. Impulses of directions from such incentive systems are not visible. It seems that there is an obvious need for further development of existing instruments as well as a demand for new approaches.

There is a strong need for research with respect to the usage of biotic resources. In spite of tendencies to increase the application of instruments, even negative effects by the selection of the instruments became obvious. A famous example in that context is the production of bio-fuels that turned out to have ruled out other environmental friendly alternatives, to have neglected the cascade approach and to have caused very unwelcome effects internationally. In this regard it becomes also obvious that within the sector of food production and nutrition, no instruments to increase resource productivity are existing.

Industrial minerals are not of importance quantitatively for resource usage but they are for business. They are not yet part of the discussion. Similar to material groups like metal or building materials, there is a comprehensive – and here not analysed – law for mining (including exploitation and environmental impacts). Additionally, there are no specific rules for disposal practices of industrial materials existing. To be concluded, there is a need for further research concerning the usage of industrial materials as well as for approaches of a more sustainable usage of them.

How the effects of incentive instruments can be judged, is shown below:

Table 1: Expectable effects of incentives instruments when using them explicitely to support resource efficiency (Bahn-Walkowiak et al, 2007)

	Effectivity and Efficiency of goal attainment	Extend of effect	Temporally effect horizon	Side effects	Systematic effects	Learning processes
Achievable effect						
Resource tax	+	++	middle-termed	+	++	+
	Extra conditions and rules as well as exceptions should be quantitatively land temporally limited					
Trade with certificates	+	+	middle-termed	-	++	+
	Avoid over allocation, earmarking					
Product labelling	+	+	short-termed	o	+	++
	Reduction of contra productive tax advantages systematisation and unification					
Commitments for retraction	o	o	middle-termed	-	o	+
	Avoid conflicts concerning objectives between quotas and reusing					
Informatic instruments	+	+	middle-termed	o	+	++
	Improvement of monitoring and evaluation, support for knowledge generation, avoid “over” information					
Incentives and supporting programmes for the market	+	+	short-termed	+	+	+
	Targeted extension of successful instruments to other resources (building material, Mmetals)					
Consultancy on diffusion strategies	+	+	middle-termed	o	+	++
	Combination of founding and innovation support					
Objectives	+	+	long-termed	o	++	++
	Harmonisation and ascertainment of Indicators					
Scaling: ++ = strong positive Effect, + = slight positive effect, o = no effect, – = slight negative effect, – – = strong negative effect						

One good example to product label resource efficiency was developed by the Aachen Foundation. Main objective was to increase the market demand for eco-efficient products and services that could in the medium and long run contribute to change of paradigm for sustainable production and consumption. They developed the concept very similar to the one already well established in Germany regarding electrical home appliances like refrigerator, washing machines etc. and their energy efficiency. Designwise they simply extended the label by the resources “water” and “raw material” and further more by the category “costs”. The data beyond the visible “mark” are taken from reliable institutions that offer LCA-data concerning the environmental impact of products. In order to avoid the missing dynamic that the label “energy efficiency” showed in some cases (e.g. refrigerators), the best mark “A” should be orientated by the “best available technology”. The resources water and mineral raw materials should be assessed according to their actual ecological backpack, meaning to include resource use during the whole live cycle in proportion to their service units. The part “cost efficiency” intends to include the concept of “Life-Cycle-Prices” which

means not to consider only the very purchasing costs themselves but all costs that might evolve during the usage time of a product (Dosch, 2005).

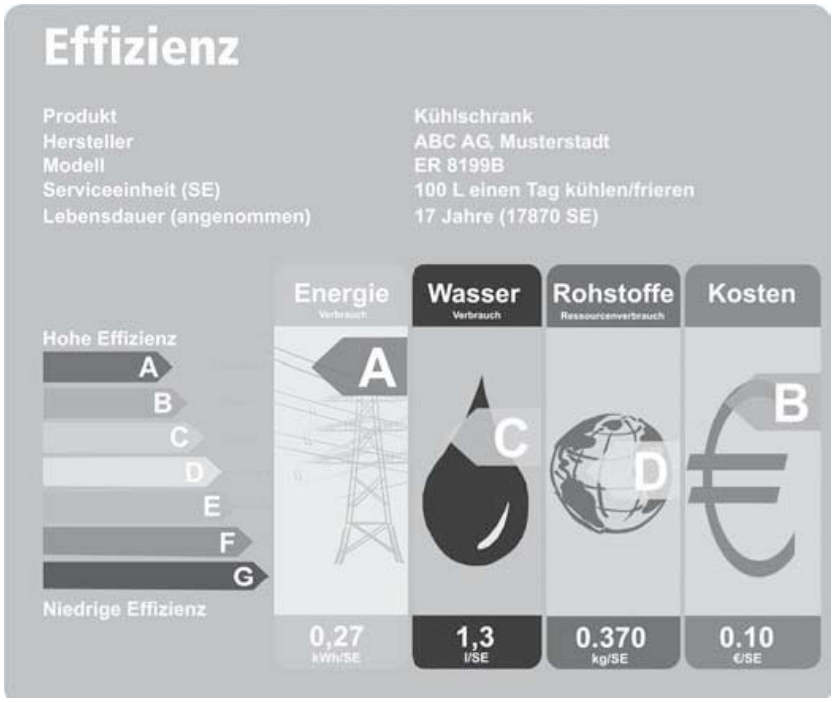

Figure 1: Draft for labelling of resource efficiency (Aachen Foundation)

3.2 Instruments with a cross-company approach considering the entire value chain

The comparative analysis of cross-company approaches which included instruments and institutions provided the following results:

- The approaches are ranged rather wide and are classified according to the ones known from environmental policy and sustainability research (Exception: fiscal political and regulatory approaches, that are clearly allocatable to macro policy). Informational instruments are detectable as well as approaches like innovations, diffusion and research and development.
- Instruments and institutions to increase resource efficiency could be approached at 3 main aspects (see Fig. 2):
  - Addressing especially those companies that are particularly inefficient („dirty end"; e.g. by minimum efficiency standards),
  - Addressing particularly innovative representatives (e.g. honouring of forerunners) or
  - Targeted increase in efficiency for the majority of the stakeholders.

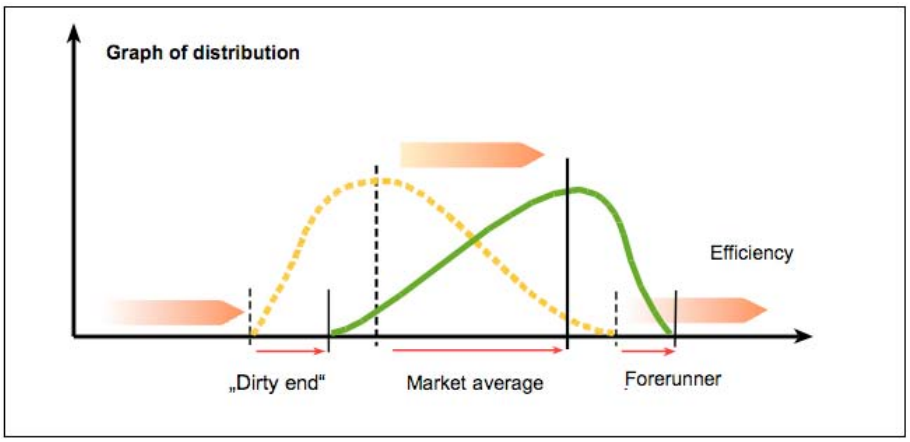

Figure 3: Resource policy for the company level

- Dialogue strategies within specific businesses gained certain importance. They aim at bridging industrial interests with political ones and bring the relevant stakeholders in direct exchange with one another in order to develop common strategies (Kuhndt et al., 2004).
- Parallel educational concepts that integrate key subjects regarding resource efficiency should be applied and specifically designed for all levels of education (in-firm training, vocational education, etc.).
- Companies and corporate networks are targeted by approaches that are rather directed inwards. Those approached targeted outwards include even stakeholders like customers (B2B, B2C), politics and / or the public
- Objectives and functionality of the approached are very different.
    - Labels / quality labels: The rather compact information about product features or producing standards offer transparency on the market and provide therefore the possibility of differentiating to other offers
    - Benchmarking can be used either as an instrument for improvement of the inner management or as an instrument to stimulate the competitiveness. As a 3rd possibility there is the institutionalised benchmarking that is offered by societies, public information centre and commercial service provider.
    - By the management of value chains the implementation of common objectives of all stakeholders relevant in the chain is better arrangeable and better to control. Different instruments can be used for that.
    - Organisations: The establishment of organisations / societies is firstly an instrument to represent common interests externally and secondly certain services are provided for their members.
    - Corporate networks: Cooperation processes provide the possibility of synergy effects on markets, in value chains, in the management and innovation processes, etc
    - Voluntary agreements are objectives from informal or institutionalised groups of companies and defined by themselves, reflecting the requirements of society or politics.
- The analysed approaches are not explicitly aligned to increase resource efficiency but due to the fact that different objectives are intended by them, even their targeted application to increase resource efficiency generally or for some specific resource is possible.

- The quantitative effect of the analysed approaches according to the resource consumption isn't high because they are only exceptionally used specifically to rise resource efficiency. All the other instruments provide potentials to be applied for resources. How they are generally to be judged according to the undertaken analysis, is summarised in table 2
- All of approached instruments could be integrated in a cooperative resource policy because they are using similar mechanism of action. Those instruments which proved to be more effective (like labels / quality labels, benchmarking, management of value chains, corporate networks) should be included according to their profile

Table 2: Expectable effects of cross-company approaches, targeting explicitely the increase of resource efficiency (incl. facts for the main need for action)

	Effectivity and Efficiency of goal attainment	Extend of effect	Temporally effect horizon	Side effects	Systematic effects	Learning processes
Achievable effect and need for action						
Labels / labels of quality	++	++	medium-termed	+	+	o
	concentration on a few labels that are sophisticated and widely applied					
Benchmarking	++	+	short-termed	o	+	+
	Target group specific, meaningful and free accessible resource efficiency-benchmarking database (incl. Best Practices regarding technologies and implementation tools)					
Management of value chains	++	++	short-termed	o	+	+
	Making resource efficiency specifically a topic (not as a side effect), in order to use the possibility of deducing all potential along the entire value chain					
Organisations / Societies	+	+	Medium-termed	o	+	o
	Targeted integration into resource politics					
Corporate network	++	+	short termed	o	+	+
	Support for network establishment from the very beginning					
Voluntary agreement	+	+	Medium termed	–	–	o
	Avoid abuse as defence strategy against potential political activities					
Scaling: ++ = strong positive Effect, + = slight positive effect, o = no effect, – = slight negative effect, – – = strong negative effect						

Further research is needed concerning a deepened analysis of the respective approaches' effects – generally as well as specifically for the application in terms of resource efficiency. Of interest is even the analysis of effects regarding the interaction of the different cross-company approaches. Additionally it should be deepened on the problem of how cross company approaches can be included best into a resource efficiency policy strategy.

4 Overall conclusion

An appropriate response to the urgent call for action regarding recent global challenges is to modify political and economical action according to the natural boundaries. While population is rapidly increasing on the global scale and the demand for resources increase, a dramatic rise of an efficient use of them is necessary, worldwide. Reasons for an integrated and comprehensive approach in resource efficiency policy are the following:

- Chances for new future markets concerning resource efficiency,
- Resource scarcity and the tensed situation on the markets for raw material,
- The necessary improvements of the environmental situation, along the entire value chain of products,
- Design of ecological modernisation and solving possible conflicts of targets.

How to apply the instruments outlined above? How is an appropriate policy mix for resource policy supposed to look like?

A strategy for resource policy needs to be flexible in order to be able to respond to different economical, social and ecological challenges as well as to address different target groups. A policy mix first of all needs to define the direction of the political strategy for resource efficiency by general objectives and perspectives. Policies for resource efficiency can be either realised by (re-)structuring markets – meaning the promotion of research and development, support for the introduction of new technologies or products or the better diffusion of already concepted ones – or the change of the (political) frame work – meaning here mostly: the cutback of taxes that increase resource consumption, the Top-Runner strategy as well as the strengthening of EU-teshold values and not least the the promotion of dynamic labelling. In the context of the latter mentioned one, not only legal and political changes are required but even changes of mental structures and behaviours. Educational projects as concepted among others by UN-Decade for Education on sustainable development need to be included in such efforts.

An appropriate policy strategy for resource efficiency is demanded on all levels - nationally, within the EU and internationally. But since this is a political objective of quite a huge dimension it is important to focus on the most relevant aspects and even to select instruments and measures that are expected to be most effective. This selection is presented in the figure below.

Figure 3: Roadmap to increase resource efficiency (Kristof et al, 2007; further development from Bahn-Walkowiak et al, 2007)

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Chapter 12 Towards future sustainable consumption policies; a three-tier approach

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1 Introduction

Now that the interest in environmental issues – and in particular global warming – grows again, policy-makers (supra-national, national, or regional), non-governmental organisations and corporations alike are confronted with the question how the environmental impact of production and consumption is to be decreased. As opinion polls and market research argues that consumers are also willing to do their share, political questions surrounding consumption come to play a prominent role in the discourse on sustainable consumption and production (SCP). Current debates might appear to be an example of symbolic politics – in for example the discussion on inflatable Jacuzzi's – but they do tap into wider debates on the role and responsibility of consumers in causing and solving environmental problems.

In the international policy-arena, the question how consumers, consumption, and its environmental impacts, should be governed are central to the Marrakech process. Various policy initiatives are set in motion which require government to rethink sustainable consumption policy. At the same time, national governments – and her I refer to the Dutch government, probably among others – argue that it is too difficult to govern consumption because consumers are so different from each other and unorganised, and that people might say one thing as citizen but act different as consumers. Above all, they argue that the experiences with 3 decades of sustainable consumption policies show it is best to focus on the producers and products instead.

Herein lies a challenge. There is an certain momentum to develop new sustainable consumption policies but such policies should overcome existing scepticism, not only among policy-makers but also from non-governmental organisations, from corporations, and from academics.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

This paper attempts to contribute to this debate on SCP policies anno 2008. It argues that in developing good SCP policies, we should not only look at economic and communicative instruments that did or (more often) did not work in past. Instead, we need to depart from an analysis of contemporary societies and developments within society, such as the increasing importance of governance vis-à-vis government and the proliferation of political consumerism, to understand the position of consumers in governing SCP. With that, we will move from an individual perspective on consumers (supposed to be led by values and economics) to a more contextual perspective on the role that consumers (can) play and economic think about instruments to involve consumers into governance for sustainable consumption and production.

After a brief historical description of the developments in SCP policies, I will draw upon recent work from social theory to characterise the changing role of consumers vis-à-vis (national) governments and market actors. This will be the basis of a three-tier approach to study the role of consumers in governance for SCP. The case of sustainable clothing will be used to 'fill in' this theoretical model and to illustrate how this approach can help in developing future SCP policies that can help to involve consumers in bringing about sustainability.

The reasoning is as follows. It will be argued that we should base our analysis of (possibilities and limitations of) SCP policies on the three different roles that consumers can take in governing production-consumption chains. By means of this exercise, I aim to illustrate that new 'sites' of policy-making are developing, and that innovative initiatives show that some established assumptions on the roles that governments, ngo's and consumers can and should take should be reconsidered.

2 A brief history of sustainable consumption policies

By no means is this a complete overview of the various policies that have been, or still are, in place. In this brief historical analysis of sustainable consumption policies I aim to illustrate how the perspective on consumption and consumers developed over time. The focus on this perspective is informed by an interest in the role that is attributed to consumers and – related to that – the 'science of consumption' that underlies such perspective.

2.1 Early references to consumption and sustainability

If for example we look at early important references to the relation between consumption and environmental decay, we must include the Club of Rome's report Limits to Growth. In this report, it was recognized that the increase in population (thus increase in the sheer number of consumers) was one of the most important drivers for the predicted environmental crisis. This argument was reflected in mainly American discussions on 'the population bomb'. This emphasis on the quantity of consumers, some argue, distracted attention from a much more important issue, namely the discussion on Western lifestyles and the quantity of consumption (Cohen 2001).

With the publication of Our Common Future (WCED 1987), consumption patterns reached the agenda. It was argued that a future environmental crisis is unavoidable if developing countries are pressurised to follow in the footsteps of Western countries and develop comparable consumption and production patterns. But although the consumption patterns of Western consumers are recognized to be at the core of the problem, the report also states that economic growth and greater consumption are prerequisites for sustainable development.

In the Netherlands, the debate on consumption and the environment took a somewhat more instrumental turn. The dominant perspective to understand, and influence, consumption was informed by social-psychological approaches to consumption. These approaches, informed by the Attitude Behaviour model, had a distinct perspective on the desired form of sustainable consumption policies. "Consumption policies in the Netherlands during the 1970s and 1980s were organized around information campaigns to educate people about topical environmental problems and their personal responsibilities in helping to ameliorate them." (Martens and Spaargaren 2005). Examples of such campaigns include the so-called Postbus 51 campaigns, making of mass-media broadcasts, and, arguably the most well known campaign entitled Zuinig Stoken/Zuinig Aan.

2.2 A new impetus for sustainable consumption policies

The debate on sustainable consumption, and the way to achieve that through policies, gained interest in the early 1990s. The 1992 Earth Summit paid particular attention to consumption and with the recognition that consumption is one of the major causes of global environmental problems came the challenge to develop appropriate (global) policies. To meet this challenge, a great number of initiatives was set in motion. At the international level the UN Commission for Sustainable Development launched a research program to target this challenge and next to that the OECD launched its research program to tackle consumption. On top of that, national governments formulated new policy objectives. As Murphy and Cohen illustrate: "with bewildering speed a long list of learned societies, national governments and non-governmental organizations also rushed to articulate positions concerning the environmental effects of contemporary consumption practices" (Murphy and Cohen 2001). These developments meant a shift from the conventional practices of environmental policy-making where the emphasis clearly lied on targeting producers, the occasional information campaigns notwithstanding. From 1992 onwards however, consumption was framed as a legitimate and relevant domain for environmental policy-making.

This coincided with the increase in importance of the European Union as regulatory agency. Although the EU might originally be designed to bring peace and tranquility to Europe, it has been largely concerned with establishing and protecting the single European market. The European Union become involved in drafting regulations which sought to tackle consumption: "the EU began to experiment with consumption-focused environmental

legislation in the early 1990s as consumption-related environmental problems became more acute – particularly the growing mountain of domestic solid waste." (Murphy 2001). The EU attempts to design consumer-oriented policies were characterized by the recognition of the links between production and consumption. In response to for example the problem of domestic waste, the EU recognized that attempts to reduce the environmental impact of consumption would also need to involve producers. Thus, when in 1994, the EU developed the Packaging and Packaging Waste Directive (PPW Directive), it was logical that notions such as extended producer responsibility were brought into European environmental law. The consequence was "that key obligations in the Directive rest with the producers of packaging rather than consumers." (Murphy 2001).

This is not to say that consumption policies were solely focused on making producers responsible. Governments also sought for new policy-instruments to change consumer behaviour. This was partly motivated by the emergence of a new perspective on consumers and consumption. The social-psychological perspective gradually gave way to more rational models of consumer behavior. Economic theories suggested that consumers should be seen as homo economicus, as rational beings who could be trusted to weigh different interests in making decisions. In this context, new policy instruments were implemented. For example, "the European Eco-labelling Scheme Regulation was agreed in 1992 and aims to promote the design, production, marketing and use of products that have a reduced environmental impact throughout the entire life cycle." (Murphy 2001). By providing the right information consumers can make the 'right' decisions. In a similar vein, economic instruments gained popularity, either as tax or subsidy.

2.3 Developments in the 1990s

In the second half of the 1990s, various developments came together. The limitations of existing sustainable consumption policies were recognized by policy-makers and academics. These policies depart from a way too rational perspective on consumption, they did not acknowledge the difference in different consumption domains, and ignored important questions about the levels and quality of consumption. In the Netherlands, various research projects were instigated to deal with the complexities of consumption policy (for example Domeinverkenning, the project Perspectief, etc.). At the same time, the political climate for sustainable consumption policies worsened, and little initiatives were taken by state-actors.

In the same period of time however, another movement was also visible. Civil society groups, academics, and (innovative) corporations recognized the potential that consumers have to change production-consumption systems through the market. Notions such as political consumerism or ethical consumerism gained ground as a new discourse on consumption developed. As for example argued by Micheletti, "politics is (…) entering the marketplace through the pocketbooks of consumers and the organization that serve them" (2003) and "this politicizes what we have traditionally conceived as private consumer choice and erases the division between the

political and economic spheres" (2003). This changed the view on consumers; they were no longer seen as optimizing their own benefits but it was also realized that they could (be made to) take more general, political considerations into account.

The development of eco-labeling and political consumerism is mirrored in a change in discourse. Consumers are now attributed greater responsibility and power in realizing societal change and nothing illustrates this better than the now frequently found notions of the "citizen-consumer" and "political consumerism". This builds upon the belief that in post-Fordist times, production-consumption chains are more and more driven by the authoritative consumer. (Keat, Whiteley et al. 1994). These trends have led civil society organizations and corporations to try to influence consumption choices by the provision of information. Consequently, sustainable consumption governance is now more pluralist than ever. These developments obviously stretch beyond the borders of nation-states, not only because the production-consumption chains are often global, also because many labels purposively seek to tackle labor and environmental conditions in other countries.

3 A new perspective on consumers

This brief history of the initiatives in sustainable consumption policy, shows a change in the role that attributed to consumers. From an individual, value-driven perspective on sustainable consumption, we have moved to an economic perspective and to a perspective which emphasises the political aspects of consumption. Consequently, consumers come to act in different disguises. The objective of this section is to discuss these changes from a social theoretical perspective. Drawing upon the work from Beck, Sassen and others, I argue that to understand the role of consumers in contemporary societies, we need to acknowledge that consumers exist in three different 'roles'.

The influence of globalisation on contemporary societies, and governance relations within those societies, is a continued key topic in social theory. Authors such as Beck, Sassen and Held have focussed on the consequences of globalisation for our ways of making policy and offer complementary analyses. It is no coincidence that a focus on policy-making processes needs to depart from an analysis of the role of the nation-state. Where the Europeanization and globalization of politics proceeded rather smoothly in the 1990s, the early 21st century witnessed the emergence of stronger anti-European movement, and with that a revival of national politics. Beck (2005) has discussed this development very critically, arguing that politicians are eager to focus on the national arena but thereby ignore, and overlook, the fact that many problems and solutions are not to be found level of national states. Instead, politics anno 2008 take place at lower levels (such as EU regions), at higher levels (EU, WTO) or simply outside the domain of state-politics. A similar argument is made by Sassen (2006). She departs from medieval times to describe how configurations of territory, authority and rights are shaped and change. If we understand the shift from medieval politics to the nation-states, Sassen argues, we have a better view on the

emergence of post-national, de-territorialized forms of policy-making. Crucial for this paper is the question how the emergence of post-national, de-territorialized forms of policy-making relates to the changing position of citizen-consumers. To describe the position of citizen-consumers, I will take three 'traditional' roles of citizen-consumers as points of departure but also argue that the boundaries between these roles are blurring.

A first point of departure lies in Sassen's analysis of citizenship. The notion of citizenship is traditionally used to refer to the relation between nation-state and individuals but once new 'levels' of governing emerge, citizen find themselves in new relationships. Acting as citizens, we not only have certain duties and responsibilities towards the government but we also have expectations, such as a certain level of environmental protection. In the globalising society of today, this relation comes under pressure. As nation states loose power to supranational and regional governments, we now become citizens of multiple 'states'. This is not necessarily mean that the bond between citizens and states is weakened. In the past, we saw that environmental politics was often a site where nation-states experimented with new means of interactive, participatory policy-making – giving meaning to the concept of ecological citizenship. As the deterritorialisation and denationalisation of politics leads to the emergence of multiple 'states', we also see that these various 'states' are concerned with environmental issues and struggle to gain support from the public – and with that legitimacy. Consequently, various ways to involve citizens in environmental politics are experimented with, sometimes traditional but sometimes innovative, for example as boundaries between state and market spheres are crossed.

A second point of departure to understand the position of citizen-consumers in contemporary politics lies in the relation between individual and markets. For a long time, his/her consumption behaviour was considered to depend on personal motivations, individual values and/or economic considerations. With that, politics were effectively left out of the market-place. Recent studies in political consumerism has emphasized that this image needs revision. As non-governmental organisations, corporations and governments come to initiate and support eco- and sustainability labels, consumers are now able to take 'civic' considerations into account on the shop floor. Through this development, the market turns into a arena for policy-making, drawing upon the authority of consumers.

A third point of departure lies in reciprocal social relations that citizen-consumers are engaged in. Due to globalisation and the related rise of global communication and information networks, the social relations that we are embedded in exceed bounded areas such as workplace, family, and neighbourhood. Increasingly, we relate to people in distant yet nearby places. Her one can think of fellow academics with who one has frequent contact, but as production-chains become more transparent, it for example also becomes possible to get acquainted with the producers of the jeans one buys[1]. Our consumption choices are not only meant to satisfy individual needs but are also part of lifestyle and places us into a context of others – nearby or far away. Various policy-instruments – generally employed by

[1] See www.made-by.nl for an example of a tracking and tracing system.

non-governmental organisations – stress individuals their responsibility vis-à-vis others and thereby seek to embed sustainability considerations into the lifestyles of consumers. Archetypical examples of such instruments include The Ecological Footprint or Eco-teams. Through these instruments, consumers are informed about the environmental impact of their consumption patterns, and how their consumption choices relate to, and affect, the lives of others. Recent examples – such as food miles – show how this kind of instruments can be linked to products – and thereby the market. For example, through Foodmiles, consumers are informed about the distances that products travelled before ending up in the supermarket. Why would one provide such information? Just like the Ecological Footprint, it places individual consumption choices in a wider societal context, asking consumers to contemplate about the moral justification of consumption choices ('do you really want to buy this product which travelled 6000 km?'). But unlike the Ecological Footprint, Foodmiles 'enter' the market and enable consumers to compare different products – in some ways like an eco-label enables comparison.

This leads to the identification of three different ideal-typical positions that consumers occupy in contemporary societies while acknowledging that the boundaries between them blur.

I. As individual come to relate to various 'levels' of post-national governments, the notion of ecological citizenship needs to be given new meaning and can be a starting point for thinking about future SCP

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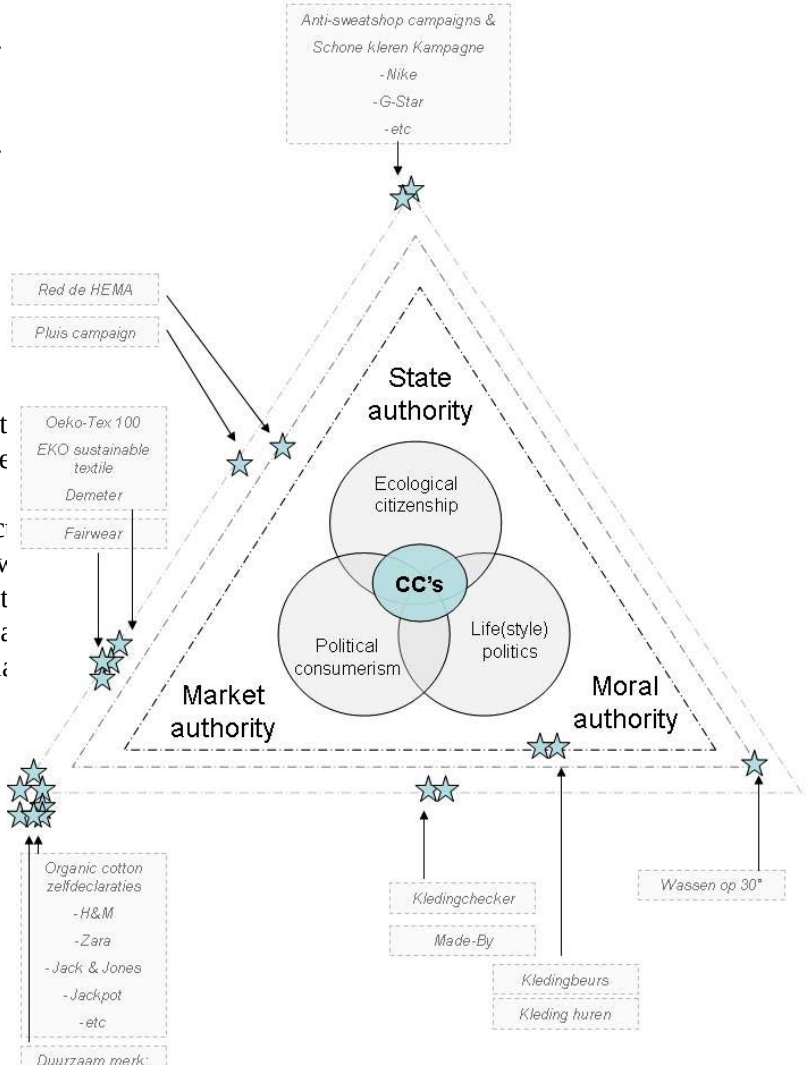

Figure 1: Three perspectives on sustainable consumption policy

4.1 Characterising the domain clothing

In many ways, this figure reflects the characteristics of the domain clothing. We see that many instruments are placed on the global scale, reflecting the global character of this production chain. We also see that market-based instruments are dominant. This is no coincidence either, the clothing chain is difficult to regulate, not only because of the global character but also because inter-corporate relations are all but transparent (with many subcontractors taking care of the actual production) and because the chain is very 'fluid', meaning that production shifts to other countries quickly and frequently.

Thus, although the relations between the production of clothing – from raw material to end-product – and environmental and social problems is long acknowledged, little attention has been given to this domain for a long time. Early governance attempts were predominantly driven by NGOs – concerned with working conditions. Governmental attempts to regulate this fluid production and consumption chain have been very limited and innovations in governing this production-consumption chain are generally driven by NGO's.

4.2 Challenges and opportunities for SCP policy

Through this exercise I not only link existing policy initiatives to the characteristics of the chain, but also seek to identify challenges for future SCP policies, short and long-term.

A clear result of the exercise is that conclusions that many current initiatives are market-driven and seek to convince consumers to shift to more sustainable products and/or producers. Political consumerism is the dominant approach and short term political intervention should start here. We observe that many labels are effectively self-declarations, and that well established, certified labels such as the European Eco-label have little influence in this domain. This leads one to question the effectiveness of these labels, not only because they might in fact be examples of 'Greenwash', or of a temporarily interest in sustainable products, but also because self-declarations are believed to be less trusted by citizen-consumers. Short term challenges for involved policymakers – governmental and non-governmental – thus lie in developing trustworthy labels and criticising phony ones to strengthen political consumerism.

Figure 1 shows that some instruments transcend 'traditional' boundaries and this offer opportunities to think about longer term SCP policies. Campaigns such as 'Red de HEMA' and the 'Pluis' campaign do not seek to influence consumer choice in the shops but also draw upon the power of consumers in to convince corporations that they should up their social responsibility and respect human and environmental rights worldwide. Another illustrate example is the Made-By campaign. This campaign seeks to enable consumers to see where and by whom their clothes were produced, making use of Google Earth. On the one hand, this enables Dutch consumers to get acquainted with the production-side of the chain but what is most innovative of this instrument is that is attempts to make production-consumption chains more transparent.

5 Conclusions

This paper started with a brief historical analysis of the changing position of consumers in SCP policies. I illustrated that individual, value-driven perspectives on consumers gradually gave way to more contextual perspectives which recognized the relations between consumers and producers. Drawing upon recent social theoretical work, I argued that we can identify three ideal-typical positions for citizen-consumers. Each of these positions has been used in developing SCP policies but in contemporary societies, the boundaries between these positions blur. Consequently, citizen-consumers are offered new possibilities to exert influence on production-consumption chains.

This paper argues first of all that future SCP policies should acknowledge the existence of these different 'sites' of policy-making. Only then can we properly understand the role that citizen-consumers can play in SCP policies. Drawing upon the case of sustainable clothing, the paper illustrated what how this approach can work out in practice. It enables us to identify challenges for sustainable consumption policies in the short and long term. The changing position of citizen-consumers in contemporary societies, and the response to that by governments, corporations and ngo's, might enable innovative means of governing that were deemed impossible before.

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Workshop：
Paradigm shifts for SCP

Chapter 13 Sustainable Consumption and Responsibility

Putting individual sustainability in context

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1 Introduction

The original motivation for this paper stems from observations made in a case study of a community action for sustainability project in the north of England. Members of the congregation of Holy Trinity church were involved with an action group campaigning on what are understood in academic circles to be sustainable consumption issues. The Christian Ecology Group participants were interviewed to establish among other things the impact of the context in which they operated on their take-up of pro-environmental and ethical behaviour options. Respondents showed a rather individualistic understanding of responsibility for sustainable consumption making very few references to collective responsibility. Instead many showed signs of attributing the responsibility for sustainable consumption mainly to themselves as individuals. Such an individualist perspective is not unfamiliar in the sustainable consumption literature, where mainstream views in particular tend to emphasise individual responsibility in proposed solutions to environmental problems (see the following for critiques of individualism: Spaargaren, 2000; Maniates, 2002; Seyfang, 2004; Southerton *et al.*, 2004b). More subtle views of sustainable consumption, which incorporate collective responsibility, are emerging.

The empirical work in question, and the relatively limited engagement with the concept of responsibility in the sustainable consumption literature, prompted an exploration of theoretical perspectives on responsibility in other areas of research. The most obvious fields to explore in complement to work on sustainable consumption seemed to be those dealing with justice and citizenship in combination with environmental or sustainability issues, given their historical interest in matters of rights and responsibilities. In the process of researching these topics some interesting contrasts began to emerge. A theoretical comparison of these fields with sustainable consumption, together with the empirical work with sustainable consumers, has lead to a framework for understanding responsibility in sustainable consumption

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

which incorporates both individual and collective responsibility and differentiates between the responsibilities of individuals.

The paper begins by presenting an analysis of interviewee perspectives on personal responsibility for sustainable consumption from the case study at Holy Trinity. It continues by comparing perspectives on responsibility in the sustainable consumption, environmental justice and ecological citizenship fields in order to better understand the concept of responsibility in sustainable consumption. Finally it proposes a new framework for the understanding of responsibility in the sustainable consumption field, built on this empirical and theoretical work.

2 Empirical perspectives on responsibility

The case study concerned was undertaken as part of a research project on community-based organisations and their role in influencing individuals to behave more sustainably (Middlemiss, 2008b). The Christian Ecology Group (CEG) at Holy Trinity church, in a market town in the north of England, has been active in promoting sustainable consumption issues to its members and to the church congregation over the past 12 years. The CEG have had an important impact on those involved, with most of the participants interviewed reporting changes in behaviour, attitudes or awareness as a result of the group's work (Middlemiss, 2008a). More detail on this case is available elsewhere (ibid).

2.1 Data and analysis method

The data presented here is taken from interviews with participants in the CEG (n=10), ranging from those that help organise events, to those that merely attend, or use the services provided by the group. The interviewees were distinctive in that most of them (8/10) had existing pro-environmental knowledge, awareness or behaviour, with half having a substantial history of engagement with ethical or environmental issues and actions before involvement with the CEG. As such they could be broadly termed 'sustainable consumers', with the one exception (who is not interested in or active on sustainability) excluded from this analysis. Interviewees represent a wide range of intensities of sustainable consumption attitudes and behaviour, however (ranging from a long history of interest and action to a more recent discovery of the issues).

The focus of this article is responsibility, and the parts of the interviews which were chosen for analysis were those that concerned the gaps between pro-environmental attitudes and behaviour. Attitude-behaviour gaps are a concept familiar in the literature (Jensen, 2002; Kollmuss and Agyeman, 2002; Maiteny, 2002). When an interviewee provides an account of the disparity between their attitudes and behaviour, they tend to touch on issues of responsibility, since explaining such a disjunction convincingly to the interviewer requires the individual to give a reason for their actions. Such a reason is likely to place fault for the attitude-behaviour gap, or responsibility for the failure to take on a specific behaviour. This may be implicit or explicit, as is shown in the data below.

2.2 Respondents' perceptions of responsibility in Sustainable Consumption

Most of the participants interviewed gave examples of the difficulties of taking on environmental or ethical behaviours, despite positive attitudes to change. These accounts were mainly concerned with the limits to their own capacities and to the opportunities around them. Respondents were not asked to explain every instance of an attitude-behaviour gap or to make judgements about where responsibility lay in the failure to take on behaviour. Many of the stories came about spontaneously: for instance in answer to questions about what pro-environmental behaviour people had taken on, they responded by also detailing behaviours they had not been able to fulfil. The fact that individuals need to explain such gaps at all shows a need to account for their own potentially blameworthy behaviour (see the literature on accounts in sociology including Lyman and Scott, 1970; Orbuch, 1997).

One of the striking features of the case at Holy Trinity was the need for participants and practitioners to 'do the right thing' in terms of the environmental and ethical questions that are raised at the church. As such, people seem to feel strongly about attitude-behaviour resolution, and bad about their failure to meet what they see as responsibilities (which tend to be attitude-behaviour gaps). Signs of a need to justify actions were seen both in the way individuals responded to questions about their behaviour and in explicit justification of behaviour. Respondents gave three types of account for their pro- and anti-environmental behaviour: listing pro-environmental behaviour in detail; extensive or unprompted explanation of anti-environmental behaviour; and explicit expression of guilt for anti-environmental behaviour. These are explained in more detail in the following paragraphs.

Listing pro-environmental behaviour (the first account for behaviour) varies by character type, but as soon as interviewees detect the subject area of the interview they tend to try to prove that they are doing their bit, or taking responsibility. While such responses do not directly address attitude-behaviour gaps, they do seem to be a means of ensuring that the interviewer knows that the interviewee is making an effort. This often results in detailed explanations of household arrangements. For instance, consider one respondent's response to a question about her environmental interests:

> I'm obsessive about recycling. Obsessive. In each room in our house you have two rubbish bins. One for paper, one for other things like dirty tissues that can't be recycled. In the garage we have a crate for bottles. I know I should really get them from the milkman but he arrives after we've gone to work and since the front of the house is south facing it's always off before you get home. So we do buy milk in cartons, which I know isn't ideal, but that's what happens. So all the plastic bottles are put in a crate, that's shampoo bottles, washing up liquid bottles, all in a crate and they are… because my husband says I would use more fuel taking them to the recycling bin… I walk down every Saturday. (Holy Trinity Respondent, 2006, 2)

The individual concerned clearly wanted the interviewer to leave with an impression that she was doing her best and offers a detailed description of her recycling practice. Such an effort to impress is familiar to the interviewer.

The subsidiary stories in the quotation above consist of unprompted explanations of the details of her specific decisions. The story about the milkman is an example of the second type of account for behaviour. Respondents feel the need to give detailed justifications for behaviour that is non-environmental. Here she suggests that she has tried to buy milk from the milkman, as she realises that it is the 'right' thing to do, but failed since the house is south facing – implying that her use of milk cartons is only through necessity. The respondent feels her responsibility to act, and responds by detailed explanation of why she could not. Quite a few respondents felt the need to justify anti-environmental behaviour and gave similar accounts of why that behaviour was not achievable for them (Holy Trinity Respondents, 2006, 2, 4, 5, 9). This is sometimes taken to an extreme extent with excuses being made for physically impossible actions (Holy Trinity Respondents, 2006, 5 and 9). Only two participants explicitly express guilt about their behaviour (the third type of account). These are two members that have been engaged in ethical and environmental issues in the long term, and that are more open about their feelings than some of the other interviewees (Holy Trinity Respondents, 2006, 6 and 8).

In general then, while participants understand the limits of their own capacities, these are not clearly associated with corresponding limits to their responsibilities in pro-environmental behaviour. Participants' discomfort with attitude-behaviour gaps could conceivably lead to their attributing responsibility in sustainable consumption both to themselves and to other parties. In practice this is not the case. Some participants mention other parties in the context of sustainable consumption but rarely in terms of blame or responsibility (Holy Trinity Respondents, 2006, 2, 4, 5, 7, 9). For instance respondents mention the lack of provision of specific products or low-packaged goods in shops (Holy Trinity Respondents, 2006, 2, 7, 9), others discuss the poor provision of public transport in the area (Holy Trinity Respondents, 2006, 2, 4, 5). However it is mostly only noted rather than explored in terms of responsibility and most statements referring to external forces are rather generalist. On provision of goods in shops a respondent comments: "Sometimes the things you'd like to buy just aren't available.", on public transport: "the trains don't run at the right times" (Holy Trinity Respondents, 2006, 7 and 2 respectively). There is little detailed consideration of the responsibilities of others, and very limited attempts to shift responsibility to others (business, government). In this sense individuals at Holy Trinity seem to have taken the responsibility for sustainable consumption on themselves.

2.3 Some thoughts on results

Participants therefore show an understanding of sustainable consumption which follows that prevalent in mainstream policy in this area (Seyfang, 2005). It seems that individuals at Holy Trinity feel the need to behave well regarding environment; they do not have a clear view on the boundaries of their own responsibility; and rarely explicitly link the responsibility for sustainable consumption to structural players (e.g. business and government). There are some interesting parallels here with previous research where active members of environmental groups have been found to assign responsibility for pro-environmental behaviour to themselves, while non-active members and non-members assign it to government or business (Eden, 1993). On the

other hand, results contrast to Hobson's findings in research on GAP Action at Home participants where discussions of responsibility "focussed for the most part on the inadequacies of absent 'others', perceived as having greater liability and capacity responsibility than themselves" (Hobson, 2006, p. 291). For whatever reason the latter findings contradict this research, a type of consumer that attributes responsibility to him or herself rather than others is not an unfamiliar one. Such 'individualisation' will be discussed in more detail in the next section on theoretical perspectives.

3 Theoretical perspectives on responsibility in Sustainable Consumption, Ecological Citizenship and Environmental Justice

The emergence of the attribution of responsibility as a theme in empirical work prompted a theoretical interest in issues of individual responsibility. The most logical fields to explore as a complement to those directly concerning sustainable consumption seemed to be those dealing with justice and citizenship in combination with environmental or sustainability issues, given their historical interest in matters of rights and responsibilities. Indeed, on closer inspection there were found to be some interesting overlaps between these research areas.

The links between ecological citizenship and sustainable consumption are considerable. While Dobson, in his book on ecological citizens, did not necessarily intend to create a normative model for a sustainable consumer, other authors, in particular Seyfang, have pointed out the parallels between his model and what they see in practice (Dobson, 2003; Seyfang, 2005; Seyfang, 2006). Seyfang has projected a reciprocal relationship between the two concepts interpreting the practice of sustainable consumption as a potential tool for the eco-citizen, and the ideals of eco-citizenship as a driver for sustainable consumption (Seyfang, 2005; Seyfang, 2006).

There is also a 'justice' connection between sustainable consumption and environmental justice as it is generally understood that over-consumption leads to low quality environments and both perpetrators and victims are created by such damage (Jackson, 2006). Environmental justice typically takes the 'victims' as its locus of interest, victims being those who have their rights (to clean environment and safe places to live) violated (Shrader-Frechette, 2002; Agyeman, 2005). Sustainable consumption on the other hand takes the 'perpetrators' as its topic, people who are neglecting their responsibilities (to consume within the limits of resources available) (Jackson, 2006).

The following section takes the topics of sustainable consumption, ecological/environmental citizenship and environmental justice in turn and explores their perspectives on individual responsibility. These topic-specific sections also broaden the discussion to include the relative importance of agency and structure within each topic area, as well as describing key conceptual models used by each topic to frame issues of individual responsibility for the environment. Following this a theoretical comparison between the three fields' attempts to unravel the areas in which concepts in justice and citizenship can help to inform our understanding of sustainable consumption.

3.1 Sustainable Consumption

Sustainable consumption as a field incorporates some distinct perspectives on individual responsibility which hinge on different conceptions of the roles of agency and structure (Spaargaren, 2000; Seyfang, 2005; Hobson, 2006; Seyfang and Paavola, forthcoming). Spaargaren identifies a distinction between the agency-oriented perspectives familiar in economics and social-psychology where sustainable consumption is explained theoretically in terms of the internal motivations of the individual, and more sociological analyses which take a structuration perspective (ibid, 2000; see also Jackson's review of the literature which summarises many of the agency-oriented perspectives Jackson, 2005). Seyfang and Paavola categorise research into three areas, two of which ('cognitive' and 'social-marketing') focus on a strategy of providing information to change individual behaviour (agency-oriented), while a third ('systems of provision') appreciates the possibility of lock-in for individuals who may not have the ability to act within the structures they inhabit (Seyfang and Paavola, forthcoming). In separate work both Seyfang and Hobson note a tendency in mainstream UK policy to paint the individual as the agent of change in sustainable consumption (Seyfang, 2005; Hobson, 2006). Both authors contrast this perspective with situated visions of societal change which see individual buying power alone as an impotent strategy for sustainable consumption. The terms 'individualist' and 'situated' will be used in the rest of this article to distinguish these two perspectives on sustainable consumption.

The individualist agency-orientation seen in sustainable consumption research and policy, tends therefore to focus on "the consumer as the principle lever of change." (Sanne, 2002) In a detailed critique of this position, Maniates sees such 'individualization' as part of a political movement in the 1980s to downsize government and shift the locus of responsibility to the individual consumer (Maniates, 2002). Maniates believes that such a strategy frames individual laziness and ignorance as the cause of environmental problems and marginalises more substantive solutions. Hobson helpfully cites the Department for the Environment, Transport and the Regions (DETR, 1998) in the UK to this effect:

> Ultimately the burden on the UK's environment is attributable to the choices and the actions of the consumers. To a great extent producers are, quite naturally, responding to meet the preferences of the consumers. (DETR cited in Hobson, 2006, p. 285)

DETR clearly attributes responsibility for environmental problems to the individual (consumer) here, and detracts blame from the producer. Witness the use of language: the 'burden' on the environment is due to failures by the consumer and the logical producer responds 'quite naturally' to their preferences. The implication is that the producer is fulfilling his responsibility (in following preferences) while the consumer fails hers (in taking the wrong choices).

Such an emphasis on individual responsibility in sustainable consumption is not inevitable, and exploring both the limits of individual responsibilities, and the interactions between individual and societal responsibilities, can offer useful insights. More recent literature on sustainable consumption takes structural influences on individuals into consideration (Burgess *et al.*, 2003;

Shove, 2003; Spaargaren, 2003; Southerton *et al.*, 2004a). Authors stress the importance of social context in giving meaning to sustainable consumption lifestyles, and in allowing genuine choice for individuals who want to live more sustainably (Burgess *et al.*, 2003; Spaargaren, 2003). In theoretical work in this area Spaargaren takes a structuration perspective on sustainable consumption, where individual agency (or capacity to act) is determined by the structure of the opportunities offered to them which in turn is influenced by individual agency. Spaargaren analyses acts of consumption in particular 'domains' of social life in terms of:

> the deliberate achievements of knowledgeable and capable agents who *make use of the possibilities offered to them in the context of specific systems of provision* (2003, p. 688, emphasis in original)

In other words the individual acts because they are capable of acting, because they know how to act and because they are taking an opportunity to act that is offered to them by their context.

The recognition of the importance of structure in individual choice leads to a different view on individual responsibility: if choice or empowering structures are not available, perhaps the responsibility of the individual is diminished and that of the producer (business or government) increased. Spaargaren and Martens link individual responsibility for sustainable consumption with reference to capacity for change.

> Capacities for change can so far be said to result from the concerted actions of (governmental and market-based) providers and innovative groups of citizen-consumers. (2005, p.230-31)

As such individuals can be held more accountable in places or contexts in which the capacity for environmental living is well provided for and accessible. This author would argue that this should be further extended to encompass the capacity of the individual for change, including the resources available to them, their understanding of environmental issues and so on. If an individual is poorly resourced to make changes, their responsibility to do so is diminished. A structuration perspective on responsibility in sustainable consumption therefore sees the individual and the context in which she lives as strongly interdependent. To give a brief example: an individual choosing to own a car helps to propagate a social system which relies on car transport. On the other hand an individual may feel the responsibility of operating without a car in a system designed for car use too onerous.

There is rather limited discussion of individual rights within the context of sustainable consumption. This is not necessarily inevitable, and some more attention could be paid in this area. Responsibilities of the individual can be reframed as those of society, as they sometimes are by those sustainable consumption researchers incorporating structural explanations in their work. For instance the individual's responsibility to live a sustainable lifestyle can be framed as the responsibility of society to provide infrastructures for an individual's sustainable lifestyle. To take this a step further a responsibility of society can be framed as the right of an individual. So the individual can be seen to have a right to live a sustainable lifestyle, and a right to be provided with sustainable opportunities by society. Considering individual and structural responsibilities and individual rights in

a sustainable consumption context allows the reasons for individual activity or inactivity to be explored in more depth.

This discussion of sustainable consumption will conclude with an outline of two conceptual models used in the exploration of issues of individual sustainability. The first is the ecological footprint, which is seen as a useful way of characterising the impacts of an individual on the earth (Wackernagel and Rees, 1996). The focus here tends to be on the amount of resources used per person (be it per Briton, per city resident or per individual). The usefulness of this is as an "aggregated indicator of natural resource consumption" (Barrett *et al.*, 2005 p. 305) or a measure of how much each individual uses in all their daily activities. On the many websites provided for eco-footprinting an individual's ecological footprint can be compared to the average in their own country, or to 'sustainable' levels of resource consumption (defined by the proportion of the earth's natural resources and waste sinks available to each individual) (see for instance World Wildlife Fund, 2008). The eco-footprint reflects an attempt to visualise the difference between how we live and how we ought to live. As such the eco-footprint implicitly identifies where people are failing in their responsibilities.

Spaargaren introduces the alternative concept of 'environmental utilisation space' originating from the economist Horst Siebert (see Dresner, 2002 for a history of this concept) and used somewhat interchangeably with 'environmental space' as discussed under environmental justice below. The environmental utilisation space of the planet is a more positive concept than the ecological footprint because while it implies ecological limits (there is a total amount of space) it also "evokes the image of available space that can literally and legitimately be made use of" (Spaargaren, 2000, p. 57). Spaargaren argues that the concept incorporates the notion of a fixed amount of resources (the physical limits of the earth) while leaving the use of these resources open to debate (for instance the precise distribution of resources). While Spaargaren does not discuss rights and responsibility in this context, environmental justice interpretations of this concept do (see 'environmental justice' below).

3.2 Ecological/Environmental Citizenship

The concept of citizenship is concerned with issues of both rights and responsibilities as applied to the individual. Dobson chronicles the rise and fall in favour of rights and responsibility in recent years in his book on Citizenship and the Environment, noting a tendency to focus on the prevalence of either rights or responsibility rather than incorporating the two (2003). Dobson does not concentrate on distinguishing rights and responsibility although his perspective is rather responsibility-oriented (as detailed below). Other schools of thought on citizenship differ, in his critique of Dobson, for instance, Barry takes a rights-oriented (republican) perspective (2006) while Bell's liberal point of view favours procedural rights and responsibilities (for instance the right for the individual to choose to take environmental impacts of their actions into account) as opposed to substantive ones (2005).

This body of work is also not easily categorised as agency or structure-oriented, as different authors have different approaches to the topic. Some authors have a tendency towards individualistic proposals for change which mirror those agency-oriented approaches offered in individualist sustainable

consumption outlined above (see for instance Connelly, 2006; Dobson, 2007). Dobson's proffered solutions in citizenship studies are educational, attitude-changing programmes offered through mainstream education, in an attempt to create environmental citizens who will then engage in environmental living (Dobson, 2003; Dobson, 2007). This is quite an agency-oriented perspective on environmental change, reliant on an individual's internal processes creating change as opposed to structures of society. Bell's model for change is a more mixed approach where citizens responsibility is to follow laws set by the government which are created in deliberative processes through the involvement of citizens (2005). To some extent this mirrors work on structuration in the sustainable consumption field: although Bell sees the responsibility to act as mainly structural. In his view an individual should follow laws and recommendations of the government on environment (structure), and has no obligation to attempt to live a sustainable lifestyle independently (agency).

In his book on the topic, Andrew Dobson presents a model of responsibility-oriented citizenship while also touching on the nature of citizenly rights (2003). Using the ecological footprint as a conceptual model he argues for a responsibility orientation: since ecological footprints are different for each individual, citizens have an individual responsibility to remain within the limits of a sustainable ecological footprint. Dobson only touches briefly on the rights dimension here, although importantly he does see the 'virtue' or overarching purpose of ecological citizenship as justice, which emphasises the right of each individual to an equal share of ecological space. This contrasts to other perspectives on citizenship which avoid talking about rights in substantive terms, preferring to concentrate on procedural rights (Bell, 2005). Dobson's vision of the ecological footprint as both a right and a responsibility, a right to a certain amount of ecological resources (for meeting basic needs) with a responsibility not to use more than one's fair share, is a useful expansion of the perception of the footprint in sustainable consumption work.

Another issue raised in the environmental citizenship field which will be discussed in more detail in relation to environmental justice is that of differentiation between individuals in attribution of responsibility. In reference to relations between the developed and developing worlds, Dobson emphasises the morality of obligations to the environment falling on those with capacity to act (2003). Connelly also notes that duties (responsibilities) and rights are not necessarily symmetrical for an individual: the attribution of a right does not necessarily result in a corresponding responsibility and vice versa (2006).

3.3 Environmental Justice

Environmental justice tends to take a structure-oriented perspective on individual sustainability, with a focus on how structural decisions affect individuals and their ability to live within healthy environments. Although many of the cases chronicled in this research area are about bottom-up protest at environmental wrongs (agency as a solution) the problem is explained in terms of structural factors that impinge on individuals. Witness Agyeman's definition of environmental justice:

> local, grassroots, or 'bottom-up' community reaction to external threats to the health of the community which have been shown to

> disproportionately affect people of color and low-income neighbourhoods. (Agyeman, 2005, p.1-2)

Note the problem is 'external' threats to the community. Equally individuals are affected because of their characteristics: ethnic minorities and low-income individuals are more likely to be affected irrespective of individual agency. As a result there is a considerably greater emphasis on rights than responsibility in much work in environmental justice (see for instance Agyeman's citation of the Principles of Environmental Justice in which only one of seventeen principles is concerned with individual responsibility) (ibid, p. 187).

Shrader-Frechette's work on environmental justice is exceptional in that she (briefly) considers individual responsibility alongside individual rights. In reference to a particular aspect of individual responsibility (the responsibility of citizens of the developed world to ensure that hazardous technologies are not exported to the developing world) she differentiates between individuals by 'responsibility through ability' (Shrader-Frechette, 2002):

> To the degree that people have the ability to make a positive difference in such situations, therefore they are obliged to do so. (ibid p. 178)

There are two ideas that benefit our understanding of sustainable consumption here: first that fulfilling responsibility depends on ability, and second that individuals have differing abilities to fulfil their obligations. Having the 'ability' to make a difference according to Shrader-Frechette amounts to responsibility requiring acts that: "normal, non heroic people are capable of being convinced to do." (ibid p. 178) This may involve individuals rejecting their allotted responsibilities where these are too onerous. It may also require supportive measures to ensure that acts of heroism on behalf of the individual attempting to live a sustainable lifestyle are not essential. Differentiation between individuals is familiar in the area of environmental justice, where equality is relative to the capacities and the structural experience of the individual (Agyeman, 2005). Such differentiation between individuals can usefully be expanded into the sustainable consumption area – where some individuals are more likely than others to have the capacity to fulfil their responsibilities, whether that is due to their own personal capacity to act or to the presence of supporting facilities which can enhance their capacity to act.

A conceptual model used in environmental justice that is useful here is environmental space (Agyeman, 2005). Environmental space represents the minimum resource requirements and maximum resource entitlements of the individual, thus recognising both rights to a decent life and responsibilities to live within ecological means. Environmental space mirrors the perspective on the ecological footprint taken by Dobson above: it represents both a limit to individual consumption (and a responsibility to keep to that limit) and an entitlement (or right) to a certain standard of living.

3.4 Theoretical comparison

Table 1 shows a summarised theoretical comparison between the approach to individual responsibility in the three areas of research considered above (sustainable consumption, ecological/environmental citizenship and environmental justice). It compares the research areas'

perspectives on agency and structure, rights and responsibility, and the use of the conceptual models outlined above. There are two columns for sustainable consumption, which deal with the individualist and situated approaches to the topic separately.

Table 1: Comparison of Sustainable Consumption (Individualist and Situated), Ecological/ Environmental Citizenship and Environmental Justice approaches to individual responsibility

Dimension	Sustainable Consumption (Individualist)	Sustainable Consumption (Situated)	Ecological/ Environmental Citizenship	Environmental Justice
Agency/ Structure	Agency-oriented: individuals have an effect on the natural and social world.	Structuration: individuals affect society which in turn affects individuals.	Diverse perspectives.	Structure-oriented: the structures of society have an effect on individuals.
Rights/ Responsibility	Individual is responsible as perpetrator of environmental damage.	Individual is responsible according to capacity accorded by context.	Diverse perspectives (tendency to prioritise rights or responsibility).	Individual's rights are violated as the victim of environmental damage.
Conceptual models	Ecological Footprint: shows (relative) effects of individual on the earth.	Environmental Utilisation Space: shows resources available for sustainable use.	Ecological Footprint: shows rights to resources and responsibility to observe limits.	Environmental Space: shows rights to resources curbed by limits to over-consumption.

While this is something of an oversimplification, as no area of research is confined entirely to agency or structure perspectives, the prominence of one or the other makes for an interesting contrast. The historic focus on agency or structure-oriented explanations for (individualist) sustainable consumption and environmental justice respectively, has perhaps masked the connections between the topics. The distinction between perpetrator and victim, for instance, may be difficult to draw, with individuals acting as one or the other depending on the topic perspective. Consider, for instance, the rural dweller who fails to use a local public transport system: is she a victim of insufficient services, or a perpetrator of climate change?

There is a link between some research areas' focuses on concepts of agency and/or structure and equivalent focuses on responsibility and/or rights. This is particularly apparent in individualist sustainable consumption and environmental justice fields. Individualist sustainable consumption research that emphasises the agency of the individual as a trigger for change also emphasises the responsibility of the individual for environmental problems. Environmental justice research has a focus on the individual's rights to a decent environment, and tends to offer structural explanations of why individuals live the way they do. In other areas this connection is less straightforward.

Situated sustainable consumption attempts to combine both agency and structure in its explanations of societal problems and of the potential for change but is rather fixed on responsibilities rather than rights. This may be an issue of framing, as discussed above responsibilities of society can be reframed as rights of the individual. Environmental/ecological citizenship, on the other hand, has had varied emphases on agency and structure and rights and responsibilities over time which do not link up so neatly. If

anything this shows that both rights and responsibilities can be used to theorise about individual sustainability.

The different treatment of two basic conceptual models (ecological footprint and environmental space) by the different disciplines is also revealing. Both environmental justice (using environmental space) and ecological/ environmental citizenship (using ecological footprint) attempt to incorporate rights and responsibilities into conceptual models. In contrasts the same models used in the sustainable consumption field have a rather more responsibility-oriented vision of individuals. In individualist sustainable consumption (ecological footprint) the emphasis is on the effects of the individual on the earth (failure to meet responsibility) and in situated sustainable consumption on available resources for individuals to consume (within limits of responsibility).

The consideration of sustainable consumption in the context of justice and citizenship is useful, adding new dimensions to understanding of individual responsibility. Two points in particular emerge from the discussion above:

1. Considering sustainable consumption in the context of justice and citizenship leads to a more subtle understanding of responsibility for sustainable living, which does not automatically accrue to the individual, but is rather a shared obligation between individual and society.
2. Justice and citizenship perspectives suggest that responsibilities are likely to differ between individuals given people's ability to engage with change and the nature of the context in which they operate.

These are the main starting points for the following section which proposes a framework for the concept of responsibility in sustainable consumption.

4 A framework for responsibility in Sustainable Consumption

If the responsibility for sustainable consumption is framed as a shared obligation between individual and society, this implies a move away from a causal explanation of sustainable consumption activity as driven only by the individual, adding the context of the individual as a further explanation for change. It also suggests a more relative conception of responsibility in sustainable consumption, where the boundaries of responsibility for behaviour are formed according to the specific individual's capacity to engage with change, and the nature of the society in which she lives. The following section attempts to redefine the ecological footprint as a conceptual model to address these issues.

4.1 Conceptual model

Figure 1 is a conceptual model which attempts to represent individual responsibility in context. At the centre of this diagram is the individual's ecological footprint made up of both their rights to a liveable amount of ecological space and their responsibilities to use only a sustainable amount of space. This relates to Dobson's conception of environmental footprints in his work on environmental citizenship, and to the concept of environmental space in the environmental justice field (Dobson, 2003; Agyeman, 2005).

The four ‘capacities’ that sit around the footprint are made up of external structures (here given as Organisational, Cultural and Infrastructural Capacity) and individual context (here given as Personal Capacity). The word ‘capacity’ here is used to mean the ability to enable individual responsibility. As such individual responsibility is subject to that individual being in a context in which his or her own (personal) capacity is high enough, and the capacity afforded by his or her context (organisations, culture and infrastructure) is also high enough.

The arrows linking the footprint and the various ‘capacities’ here are two-directional. This is important because it means that the boundaries of the individual’s footprint can be stretched or shrunk by all four surrounding capacities. If, for instance, a person has very low personal and infrastructural capacity, with limited personal resources and limited local service provision, their footprint will be larger. On the other hand if a person has high capacity due to his or her context their footprint will be smaller. There are likely to be upper and lower limits to footprint size, defined by carrying capacity on the upper side, and decent standard of living on the lower side, as seen in work on environmental space in sustainable consumption and environmental justice (Spaargaren, 2000; Agyeman, 2005). The boundaries of the individual’s footprint are specific to individuals within contexts, however, and there are likely to be instances in which an individual footprint is above the ‘sustainable’ size due to specific local and personal capacity reasons. This links to Spaargaren and Martens’s idea that ‘how much is enough’ needs to be addressed socially and politically and not only from an ecological and technical perspective (Spaargaren and Martens, 2005).

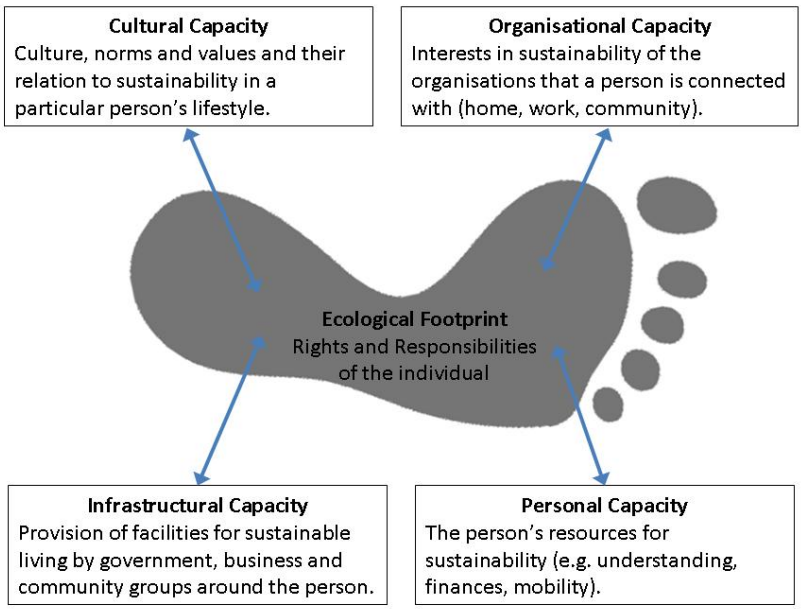

Figure 1: Proposed model of the rights and responsibilities of a sustainable consumer and the contextual factors affecting these

The different capacities are defined in brief in figure 1. The origin of these is not self-evident given the data and theory presented in parts 2 and 3 of this article and as such they merit more detailed treatment here. All of the

'capacities' in the diagram relate to the specific context of the individual concerned and as such will be different for each person. The 'capacities' could differ, for instance, between two neighbours who have slightly different lifestyles. The concept of 'lifestyle' is used after Spaargaren (and as such Giddens), as the set of social practices in which an individual engages in daily life (Spaargaren, 2003).

Cultural Capacity refers to the accepted norms and values within a person's lifestyle. If sustainability is a part of, or connected to the world view that pervades a person's lifestyle they are likely to be more enabled to act than someone that has a world view which does not relate to sustainability. In the particular case reported on in part 2 the respondents were members of a church, and had made connections between their religion and issues of sustainable living. This gave them a strong cultural capacity, in that their attempts to live sustainably were not (in the Christian Ecology Group at least) considered culturally unacceptable. The pro-environmental culture meant that in practice environmental issues were considered an acceptable topic of discussion in church (Holy Trinity Respondent, 2006, 7). There was also an opposing culture among fellow church members, however, who saw no connection between the church and sustainability issues. This had diminished the cultural capacity of the participants, especially organisers involved whose efforts were considerably frustrated by the opposing culture (Christian Ecology Group Practitioners, 2006). Cultural barriers to, or enablers of change are a common theme in sustainable consumption research (see for instance Sanne, 2002; Burgess *et al.*, 2003; Jackson, 2004).

Organisational Capacity refers to the connections that the organisations with which individuals have contact in their day to day lives have to sustainability. This refers to two features from the case study: the importance of the value that organisation leaders place on sustainability, and the links between the organisations' purpose and sustainability. In the case concerned the leadership issue manifest itself in the recognition by the rector and other local and national Church of England figures of the importance of sustainability issues to the church. This seemed to help to encourage the acceptance of the principles of sustainability within Holy Trinity. The presence of leadership on these issues was supplemented by a growing recognition in the church in general and in this specific congregation of the connections that can be made between the church's purpose and the goals of sustainability. The importance of organisational leadership is not often commented on in the literature, although there are some connections with the idea of community champions (DEFRA, 2008). The importance of being connected with organisations that recognise the goals of sustainability is also relatively unfamiliar, and it remains to be seen if either of these factors can be generalised outside of the context of community action on sustainability.

Both Infrastructural Capacity and Personal Capacity are more familiar concepts, although as discussed under 'sustainable consumption' above the former is a relatively new area of focus in this field. In the case study in part 2 these are referred to in more detail. Infrastructural capacity is interpreted here in a very broad sense, referring to the provision of products and services by surrounding organisations, be they government, business or community driven. In the case study the Christian Ecology Group provided some extra facilities to members that allowed them to fulfil their environmental responsibilities. On the other hand respondents struggled to find certain

products or services in the facilities provided by the local council (transport) and businesses (especially supermarkets). There is no exhaustive list of the elements of personal capacity that might have an effect on ability to fulfil environmental responsibilities. In this case the sorts of inhibiting factors that emerged were physical (inability to walk, or carry recycling), financial (inability to afford environmental or ethical products), administrative (inability to switch to more ethical banking). Participants also referred to lack of awareness of environment and ethical issues as a factor influencing their behaviours before their involvement in the group.

Other authors have attempted to categorise influences on individual sustainability (note not explicitly on responsibility) including both personal and structural influences and there are some resonances with this work (Kollmuss and Agyeman, 2002; Barr, 2003; Southerton *et al.*, 2004b). Southerton et al in particular give a typology of structural constraints to individual action on sustainable consumption which resembles to a great extent that evolving here. The constraints include the resources available to the individual (economic, cultural, social), normative pressures on the individual (for instance requirements of 'fitting in') and the material and infrastructural arrangements to which the individual is subject (e.g. spatial proximity of services which enable choices) (2004b).

4.2 Discussion

The revised conceptualisation of the ecological footprint presented above situates individual responsibility for sustainable consumption in the context of the individual's capacity and of the structures of society which affect the individual. As such the model also differentiates between individuals' responsibilities for sustainable consumption according to their capacities and the capacity of the structures that they inhabit. This new perspective has some implications for the way that we see the sustainable consumer.

Firstly we must accept that some actions are impossible for some people as a result of their own capacities and those of the structural context which they inhabit. Being aware of this should result in more feasible demands from consumers and could reduce the feelings of guilt associated with unfulfilled responsibility. An example from one respondent in this study follows:

> My daughter, she even banks at banks that [invest ethically]… you know… I am impressed by that. But I'm 70 and my life is so complicated, my money is where it is and I just haven't any more energy or skill in finance to move it. I feel a bit guilty about that. I ought to do it. I ought to make a stand like my daughter … (Holy Trinity Respondents, 2006, 6)

The respondent is 70, has relatively recently taken on the management of her own finances after the death of her husband, and is reluctant to change arrangements as a result (her 'skill in finance' is limited). She requires a local high street bank to manage her money and there is no local ethical banking provision. As such the above respondent lacks both the personal capacity to change her bank accounts to ethical providers, and the infrastructural capacity that would have been present had a local ethical banking service been available. It is notable here that despite her strong links to the church which has a considerable interest in sustainability (organisational capacity) and her being influenced by the alternative culture

of the Christian Ecology Group (cultural capacity) she is still unable to act. The guilt she expresses is discussed in more detail in part 2 above.

Secondly it is the case that an individual's responsibility for their actions on environment is not always easy to ascribe. It is indeed likely that the boundaries of individual responsibility are subject to some contention, with different cases being judged differently by different people. An example in this case comes from a respondent discussing her commuting habits:

> at one point when I worked near the railway station, I'd quite often get the train to work. But now … to get to [place] I'd have to leave at [time]. The effort involved… I have to say it just wouldn't fit in. (Holy Trinity Respondent, 2006, 2)

The above respondent is a part time worker with two school-age children. Her decision to use her car over public transport to commute to work is based on limited time resources, particularly as she starts work early in the morning as a teacher, as well as the absence of an easy connection by public transport to her workplace. Whether these particular individual is neglecting her responsibility or not is up for debate, and would depend on perception of what is and is not acceptable in terms of sustainable consumption behaviour.

Both examples given above recall Shrader-Frechette's call for acts of environmental responsibility that do not require 'heroism' (Shrader-Frechette, 2002). Exactly what kind of pro-environmental behaviour is acceptable and what is beyond the power of ordinary mortals needs closer and contextual examination. In any case the ascription of responsibility individuals, and ensuing guilt seen here in an empirical context when one fails to perform, is not a long-term strategy for encouraging people to live more sustainably. As Maniates puts it:

> you cannot plant a tree to save the world – and as citizens and consumers slowly come to discover this fact their cynicism about social change will only grow (Maniates, 2002 p. 59)

True personal empowerment for change in sustainable consumption must involve understanding of the responsibilities one can take on, but also understanding of the limits to one's own responsibility due to contextual or personal capacity limits. It also must involve an understanding of the rights that pertain to individuals in terms of minimum levels of consumption.

5 Conclusion

Ideas on responsibility in sustainable consumption that emerged from empirical research in the area of community action for sustainability led the author to explore related literature in the fields of environmental/ecological citizenship and environmental justice. A conceptual model based on this empirical and theoretical research was presented here. This changes sustainable consumption work in two ways: it situates the individual's responsibility within the structures that they inhabit and it differentiates between individuals by their capacity to act. This understanding of responsibility in sustainable consumption requires us to accept that individuals may be unable to meet 'responsibilities' as conceived by government or academics. Equally the exact nature of an individual's responsibility for sustainable consumption is not always clear, and should be a matter for discussion rather than prescription.

The empirical work on which this research is based is rather limited, and the author recognises the dangers inherent in generalising from a specific project on community-based sustainable consumption to sustainable consumers as a whole. The conceptual model above will be subject to iterative work in the future in the area of community-based sustainability, and the author would encourage its appropriation in other contexts.

Acknowledgements

I am indebted to Joseph Murphy, Jouni Paavola and William Young who commented on an earlier draft of this article.

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Chapter 14 In search of sustainable lifestyles.

An antithesis to economic growth.

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1 Introduction

Climate changes in recent years bring attention of more and more people towards environmental problems and define them not only in terms of depletion of resource base, but also as limits to the assimilating capacity of Earth. Technocratic solutions, including eco-efficiency strategies, do not seem to be able to compensate for increases in consumption levels across the globe. Alternative solutions that could question the main tenets of the current economies – continuous economic growth, globalisation and markets - are clearly needed and are slowly emerging. Continuous economic growth is being put under scrutiny at least by few scholars and the anti-growth or de-growth discourse is being initiated. Globalisation has been questioned for removing the national boundaries of individual economies, for creating a single world market ruled by the private capital of multinational companies and for disappearance of individual cultures; localisation has been proposed as the anti-thesis to globalisation. Markets are being criticised for their failures and alternative systems for satisfying needs with common goods or beyond-the-formal-market means are being developed.

New initiatives that emerge as a complement to the eco-efficiency approaches and that are based on ideas of localisation, sufficiency and post-material pro-environmental values are sustainable lifestyles, slow living and simplicity movement. These strategies are slowly entering or rather creeping into political agenda, propagated by NGOs and grass-root organisations across the world. The number of people who are shifting towards more sustainable lifestyles and less materialistic values is slowly increasing. The number of alternative communities that offer higher quality of life to its tenants with lower material intensity per capita is growing. And initial attempts to de-commercialise our lives are also emerging. However, these initiatives of individuals and communities are considered to be rather an exception to the rule than the mainstream and desired way of living. What are their institutional barriers? What changes would allow reaching higher quality of life with less material resources, impacts and less stuff, but with more leisure time, personal development and happiness? Would challenging

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

the premises of neo-classical economics of continuous economic growth and developing new model of economic de-growth provide institutional frameworks, within which more sustainable consumption patterns and lifestyles can thrive? This paper explores these questions.

In the following section the distinction between traditional and sustainable lifestyles is made and examples of some alternative initiatives are presented. Section 3 analyses barriers that current institutional frameworks create for alternative individual and collective initiatives and more sustainable lifestyles. Section 4 explores what kind of changes in the existing frameworks are needed to facilitate the shift towards more sustainable lifestyles and to help the current niche initiatives become more normalised and widespread. Finally, conclusions are made in section 6.

2 Sustainable lifestyles: utopia or reality?

This section attempts to define a lifestyle and to explore the differences between traditional lifestyles and alternative types of living, such as more sustainable lifestyles, sufficiency lifestyles, and simple living. Examples of alternative lifestyles are presented and discussed in order to provide insights into whether these types of living are a utopia or reality.

2.1 Lifestyles and sustainable lifestyles in theory

In order to understand the difference between traditional and more sustainable lifestyles one needs to first define what a lifestyle is. Lifestyle is a way we live our lives that allows us to fulfil our needs and life aspirations. Lifestyles are "referred to the patterns of consumption and use (of material and symbolic goods) associated with different social groups and classes…Lifestyles may be understood as a focus of group or individual identity, in so far as the individual expresses him or herself through the meaningful choice of items or patterns of behaviour, as symbolic codes, from a plurality of possibilities…" (Edgar and Sedgwick, 1999).

Lifestyles are comprised of activities or purposeful strategies that we undertake to reach a certain level of well-being or quality of life. Since well-being is typically associated with material possessions, lifestyles are to a large degree defined by consumption activities. In this sense, lifestyles also serve as "social conversations", in which people affiliate and differentiate themselves from other people, signal their social position and ambitions, as well as psychological aspirations. Many of these signals are mediated by commodities or other types of possessions and are therefore closely linked to material and resource flows in the society.

"Sustainable lifestyles are patterns of action and consumption, used by people to affiliate and differentiate themselves from others, which: meet basic needs, provide a better quality of life, minimise the use of natural resources and emissions of waste and pollutants over the lifecycle, and do not jeopardise the needs of future generations" (CSD, 2004). Developing lifestyles into more sustainable ones is a large challenge, because individual short-term lifestyle strategies and gratifications are not always in line with collective and long-term intra- and inter-generational interests. It is also clear that low resource consumption is not always a sign of a sustainable lifestyle, but could be a sign of people living in poverty and not being able to address their basic needs. On the other hand, high material intensity of lifestyles does

not always correspond to the better quality of life, because even if people may live in economically and environmentally better conditions, their social networks and social capitals might be limited, and therefore the quality of life might not be as high as expected and thus such lifestyles can hardly be called sustainable.

2.2 Sustainable lifestyles in practice

Sustainable lifestyles include activities that can be distinguished in terms of greening consumption patterns and affecting consumption levels. Activities comprising greening consumption patterns include purchasing environmentally and socially sound products, participation in various eco-efficiency strategies, such as conserving energy and water by good housekeeping measures and energy/water-efficiency services, e.g. improving insulation in the house, and separating waste streams. Other types of initiatives that are not as widely spread as the greening consumption patterns initiatives are those that deal with reducing consumption levels of materials and energy used for satisfying people needs. These initiatives are often based on sufficiency principle and include voluntary simplicity lifestyles, slow living movements, and various sharing initiatives. The development of some of them is driven by the search for the lost sense of community and social belonging, for more fulfilling life not defined in terms of material possession, but rather in terms of personal and spiritual development, or as a protest against commercialisation and commoditisation of every part of human life in developed economies.

Self-sufficiency lifestyles are based on the idea that materialistic values can be substituted by much more fulfilling and simple actions and values that are not as material intensive as the traditional lifestyles, but still can ensure quality of life and satisfaction of needs (Krongkaew, 2003; Princen, 1997; Princen, 2003; Princen, 2005).

Lifestyles of voluntary simplicity emerge on the outskirts of consumerist and materialistic culture and aim at downscaling material intensity of satisfying human needs, finding alternative ways of expressing social status or re-discovering traditional, simple and more sustainable values of family and community ties and social networking. A study by Crag-Lees and Hill (2002) showed that some people practicing lifestyles of voluntary simplicity moved to smaller towns in the USA, Canada and Australia to avoid the growing materialism and promote community-based culture already in mid-1970s. They might also be driven by environmental and health values (Etzioni, 1998), concerns for over-consumption and justice to developing nations, for growing globalisation and invasion of advertising into private spaces. Some people are looking for possibilities to reduce their expenditures and dependency on consumer goods, to find new ways for self-actualisation and to cultivate non-materialistic sources of happiness and meaning. Some studies demonstrate that people joining such communities are those who lead affluent lifestyles (Myers and Kent, 2004), professionals with hobbies related to gaining knowledge, self-development and networking. According to the Simple Living Network (Craig-Lees and Hill, 2002) many people living in these communities take part in arrangements, where they can trade work and services with other members of communities (e.g. organic food centres or local exchange trading schemes). It is not uncommon, that people

reduce working hours to spend more time with family, friends and on hobbies.

A similar example from Denmark is co-housing communities, pioneered in the early 1970's (Hanson, 1996). The main goal of co-housing communities is to respond to the basic needs of modern households – security, social contact, childcare and economic efficiency - by providing community living. While every household has own private residence, it also shares with the neighbours extensive common facilities, such as a large commercial scale kitchen, dining hall, children's playroom, workshops, guest rooms and laundry facilities. These neighbourhoods create cross-generation communities composed of singles, couples, families and the elderly, which encourages social interaction. Shared use of facilities, household equipment and property minimises the material intensity of their lifestyle. Similar co-housing ideas only for elderly are now being spread in Europe (Bamford, 2005). An additional feature of these communities are health and household services provided by companies and shared by residents.

Eco-villages are also an interesting and quite advanced way of simple living which reduces environmental effects and creates positive social outcomes. Eco-villages are alternative small-scale communities, in which people chose to live in accordance with environmental and social principles. They are spread throughout the world and seek independent infrastructures, including housing and roads, and a sustainable lifestyle, e.g. simple living, for inhabitants that are built on local and seasonal production of primarily food produce. In eco-villages people also share common facilities, engage in common activities, such as gardening or hobbies, exchange services with each other., Studies demonstrate that residents of such communities report much higher level of satisfaction with life (Mulder, Costanza et al., 2006). In addition to the social cohesion factor, footprint of eco-villages is lower than the nearby communities of similar size (Widén, 1998).

Together with such long-lived initiatives, there are rather recent attempts to revive the spirit of post-materialism and develop post-modern values in line with sustainability notion. Creative Communities is a project funded by the European Commission 6th Framework Programme on stimulating the development of communities where common services and activities are taking place, having positive environmental and social implications (Manzini, 2006). The outcomes of the project are expected to contribute to the Marrakesh process that aims at developing 10-year Framework of Programmes towards Sustainable Consumption and Production (Meroni, 2007). Examples of the creative communities encompass community housing for elderly and youth, organic food centres, trading time for reciprocal services or bartering, shared transport services, exchange of knowledge, supporting local farmers, kindergartens run by parents, and community gardening. The idea behind this initiative is to change attitudes of all age groups towards social cohesion, to stimulate creativity by entrepreneurial works and to facilitate the re-discovery of the meaning of life beyond commercialism and consumerism (Manzini and Jegou, 2003). The goal is also to facilitate the creation of networks between producers, providers and users through co-creation of value and sharing benefits. The project runs on principles of collaborative networking, ethical responsibility

and quality of interactions between all the involved actors. The initiative in taking place in many countries of Europe, China, Brazil and India. It is driven by the belief that sustainability should be addressed with new sets of ideas and new ways of doing – leapfrogging, rather than taking incremental steps within the current frameworks and in full correspondence with the present institutions, who are responsible for the current disastrous situation.

Other less elaborate examples of sufficiency solutions in USA, UK, Australia and Nordic countries include, for example, common practices of renting out cottages to several people throughout a year or the hotel sharing programmes. Commonly used goods include washing machines – through community-based washing centres, cars - through car sharing cooperatives, do-it-yourself tools through tool sharing schemes and others. Many of these systems are organised by people themselves, while some of them, e.g. community-based washing centres and car sharing organisations, are organised and provided by commercial organisations.

As demonstrated in examples above there are some differences between mainstream lifestyles and lifestyles of voluntary simplicity, slow living and sufficiency (Table 1).

Table 1: Differences between mainstream lifestyles and sufficiency lifestyles

	Mainstream lifestyles	Sufficiency lifestyles
Main players	Consumers	People
Goals in life	Materialistic	Post-materialistic, spiritual, self-development
Consciousness type	Individualism	Collectivism
Affordability	In monetary terms	In time
Money	The goal, means to survival and happiness	Means to decent lives, but not the goal
Availability	In the formal market	Inside and outside the formal market
Freedom	To buy and chose on the market	To chose non-commodified goods, authenticity and local connectivity
Power position	Passive - powerless to change the system, the only way to participate is through votes on the market	Active – creating customised solutions
Marketing dogma	There is product for every need	Is this product really necessary?
Cultural stance	Homogeneity	Diversity

Examples of alternative lifestyles demonstrate that there are other ways for people to enjoy life than being consumers or quite often shopaholics, who are in desperate need of “retail therapy”, in search of new religion - consumerism or new cathedrals – shopping malls. Still, many of the aforementioned examples are niche markets and the important question is: what prevents other people from joining these types of initiatives and from leading lives of sufficiency and voluntary simplicity? This question is explored in the following section.

3 Institutional settings conflicting sustainable lifestyles

Despite the existence and emergence of individual and collective initiatives towards more sustainable lifestyles, they are seen as interesting examples or a niche, rather that the leading way of life. Why? What current

economic and institutional frameworks prevent more sustainable consumption patterns and lifestyles from playing a more prominent role and becoming normalised rather than marginalised in the every day life of an average European or American?

3.1 Scale

The main setting that rules our society is the market economy that is built on principles of the neo-classical economics. One of the major deficits of the neoclassical economics is that it largely ignores the *problems of scale both in time and space.* It means that economic growth envisioned by the proponents of the neo-classical economics is unlimited. However, this notion is not supported by the knowledge we gained in the last decades about the eco-system we live in. Experiences from nature tell us about the importance of finding a limit to or a balance between needs of any population, be it plants or animals or humans, and its habitat. So, what kinds of limits are there for the continuous and exponential economic growth? According to Daly (1987), there are four types of limits to the economic growth:

- The costs imposed on future generations in terms of available resource base and waste sinks
- Extinction of animal and plant species, because their space gets limited by human activities
- Self-cancelling effects of aggregate growth: economic growth does not necessarily increases levels of happiness, because the latter is more related to the relative level of income rather than to the absolute increase in income levels
- Negative effects on moral standards, e.g. individualism and technocratic worldview.

I would add another important limit to economic growth – time. It is no wonder that economically poor countries are rich in time and economically rich countries are time-poor. In rich countries due to increases in labour productivity, material goods become cheap compared to time, which becomes more and more a scarcity and therefore a luxury item. It is even more precious since we do biologically have limits to this resource. Spending our lives in the rate race for higher material prosperity while being so desperately limited in time does not seem to be so wise, but so appropriate for satisfaction of interests of those who rip immediate benefits from the market.

3.2 Legitimacy

Stemming from this understanding, legitimacy of governments and business is dependant on the capacity to keep *economic growth* and to secure continuous expansion of the economy. In order to keep GDP growing governments in many countries provide perverse subsidies or under-price natural resources in comparison to social and environmental costs (Arrow, Dasgupta et al., 2004; EEA, 2006) or initiate wars that spur economy and boost GDP growth. Restraining consumption therefore is seen as a suicidal mission by the majority of decision makers in governmental and business organisations.

Legitimacy of individuals is also to a large extent defined by their capacity to keep the market economy rolling. Few people pause to question

the fact that we all have been reduced from individuals to consumers in the last decades when the machinery of supply, marketing and created demand has entered into force, leaving us with largely single type of decision - purchasing decision. Focus on purchasing locks us into the formal market and eliminates other choices we might be having as individuals, such as to delay or avoid purchase. It creates a false sense that the only choice we have in reaching more sustainable lifestyles is to buy environmentally or socially sound products, forgetting another choice we all have - to stay away from shopping or satisfy our needs in less materialistic ways through "commonly held, publicly provided resources" (Segal, Pansing et al., 2001), visiting theatres or their families or by using services and community sharing systems instead of purchasing and owning products (Peattie, 2001). This only way for people to express their preferences undermines other than competitive and formal market systems of exchange. It also neglects the right to vote of those who are unable, cannot afford to or simply not willing to participate in the market. Thus, formal markets failed to offer non-commoditised goods or local connectivity, which many people desire and express the need for by developing alternative lifestyles, starting up social enterprises and sufficiency communities.

An interesting phenomenon is taking place with legitimacy of international organisations, especially pro-development and environmental organisations. On the one hand, they are gaining legitimacy by encouraging economic growth and development. On the other hand, the growing environmental awareness presents risk for these organisations since they begin to be questioned regarding their role in spurring economic growth model that has lead to environmental and social problems. In this regard, even international organisations that supposedly should assume a much more pro-active stance and develop a long-term vision for the development of the society shy away from the goals of reducing material-intensive consumption and of finding non-material satisfiers of human needs. It is clearly about consuming differently, as expressed by UNEP, but as much it is about consuming less material- and energy-intensive goods, about sharing access to goods and services and about re-evaluating the purpose of our existence on the planet Earth.

3.3 Commoditised happiness

The current economic model is geared towards markets and commercialisation and defines happiness in terms of material acquisitions (OECD, 2002). According to the neo-classical economics consumer preferences consist of well-defined needs and desires for specific commodities available on the market. Advertising industry was created to help consumers find these specific commodities, but also at the same time, to propagate the notion that "there is a product for every need" Advertising helped create consumer society. "In 1880, only $30 million was invested in advertising in the United States; by 1910, new businesses, such as oil, food, electricity and rubber, were spending $600 million, or 4 percent of the national income, on advertising. Today that figure has climbed to well over $120 billion in the United States and to over $250 billion worldwide" (Robbins, 1999). Responding to these "efforts", the average household now consumes 4 300 products annually (Incpen, 2001). And why shouldn't they, if a large supermarket offers up to 12 000 different products (Bedford and

Burgess, 1999). Consumer society has been purposefully created through efforts of advertising; by the transformation of meaning associated with commodities and how they were provided and displayed for consumers in department stores; and by invention of the idea of fashion that drives consumers to purchase goods not to satisfy their needs by in the pursuit of style and acceptance by those who define what fashionable is (Robbins, 1999).

However, the assumption of the neo-classical economics that *economic growth* typically measured in monetary terms *is a pre-requisite for happiness* and *quality of life* does not hold true. There are three fundamental problems with this assumption. First of all, research does not show that increasing individual income after certain level is directly linked to improving the level of well-being (Max-Neef, 1995). This has to do with that goods are becoming increasingly cheap, while time – increasingly expensive luxury. Spending more time on earning disposal incomes makes people poor in terms of time, which they can spend with their families and friends. Secondly, only the relative growth in income can make someone happy, not the aggregate level, which is recorded by GDP (Abramowitz, 1979). And finally, Meadows, Meadows et al. (1972) claimed that most satisfying activities for people are education, art, music, religion, creativity and social interactions and not material acquisition and ownership. Adding to this standpoint, Argyle (1987) suggested that personal happiness is determined by satisfying non-material values related to social life (marriage, family and friends) and leisure. Recent studies show that in the last 40 years consumers spend more on satisfying psychological and social aspirations, rather than material needs (Jackson and Marks, 1999). Similar studies demonstrate that very often individual income in rich countries is spent on quality of life that is defined in terms of security (Segal, 2003), access to common and less material services or social networking – something that is free of charge in less economically advanced societies.

The aforementioned settings and institutional constructs – unlimited growth, legitimacy gained through keeping up the economic growth and commoditised happiness - marginalise community-based initiatives (Leyshon, Lee et al., 2003) and prevent these “islands of sustainability” from scaling-up and competing with the formal market offers (Manzini and Jegou, 2006).

4 The change process

The final questions addressed here is what kind of changes are necessary at the level of individuals, normative settings in society and at the level of economic frameworks that would allow reaching higher quality of life with less material resources and less adverse impacts on eco-system?

Changes need to be made at all the three levels since they are interconnected. However, looking at the society from the systems perspective it is clear that neoclassical economic frameworks, economic and financial institutions, private corporate interests and the market are ruling the world. National governments have lost their power to multi-national corporations, international organisations that by their mandate should stand for better quality of life around the globe are subdued to the power and influence of the international financial organisations, e.g. IMF and World

Bank, whose primary concern is economic growth and the rate of returns on their investments, not the development and the betterment of the world. The indicators used to demonstrate the progress of the world, GDP and GNP, record the expansion of the economic activity, be it technological innovation or warfare, but not the progress in quality of life. Therefore, in order to see alternative and more sustainable lifestyles gaining grounds, radical changes in the ruling economic paradigms are needed, and first of all the main one – continuous economic growth.

Challenging the nature of the economic paradigm

In order to achieve more sustainable ways of life around the globe major changes need to made in the economic paradigms of continuous economic growth. An alternative to the quantitative growth might be economic development – not expansion of the physical stocks of the economy, but rather qualitative improvement of need satisfying system, where benefits to the society and natural systems are higher than costs (Daly, 1987).

Such a system should take existing limits as the starting point – the strong sustainability stance advocated by many ecological economists. It should be a steady-state system that develops qualitatively within the limits, but does not expand in physical terms. Some of the strategies that might be envisioned here are closed-loop economy that drastically reduces resource input due to increasing recycling processes; service economy, where products are treated as capital assets that provide functions, for which consumers pay, not for the products per se; local economies that satisfy needs of local populations, self-sufficient societies that existed before and got lost in the rush of globalisation and market expansion. For example, until the 1960s, many African economies were self-sufficient in food, which was then lost and these economies were put in direct dependence of Western societies. Asian countries were also self-sufficient with fish diet for centuries; now they are dependent on the American beef (Kasa, 2003). There should be self-sufficiency of the global economy at the inter- and intra-generation level and no-debt to the planet policy at every stage of the development.

Challenging the nature of societal conventions

Challenging the nature of economic paradigms should go hand in hand with changing of societal conventions. Less materialistic lifestyles should gain legitimacy and be normalised in society. New community based initiatives need to be developed instead of or in addition to commodities to contribute to much higher quality of life through personal development, life-long learning, access to public services, social networking and engagement. Participatory and democratic processes should instigate *changes that encourage learning, initiation and active participation of all stakeholders* in the change process (Jackson and Michaelis, 2003). As consumer society was purposefully developed, so can anti-consumerist society emerge, supported by the knowledge of adverse effects on the environment, human happiness and long-term survival of the species. Developing the new society is not a political revolution, or plot against the ruling institutions, it is a simple matter of following the basic human instinct - survival. Processes of social development and learning towards more sustainable ways of living need to be initiated right now and should include support of community groups and projects, local multi-stakeholder processes and dialogues, and in general the

development and maintenance of contexts that provide well-being through non-consumptive activities, such as social relations and leisure activities, which can contribute to social cohesion by building new norms and neighbourliness, bringing people together who share similar values and goals (SCR, 2006).

Challenging the nature of individual aspirations

Individual aspirations are affected by social and economic institutions, public groups and peers, advertising messages and many other factors. History demonstrates that despite the complexity of human nature, it is possible to change the way, in which individual aspirations, needs and desires are satisfied. The creation of consumer society can be seen as a source of inspiration as to how such a dramatic change can take place on the global level. Changing values towards non-consumerism needs support of societal actors, who may benefit from less materialistic lifestyles, lower material and energy-intensive products and services and from people with life goals set on personal development, life-long learning, flexible and less strenuous working patterns, dedication to family values, friendship and social networking, and pursuit of health and spirituality.

5 Concluding remarks

Contributing to the process of identifying alternatives to the economic growth model based on material- and energy-intensive consumption and production, ecological economics (Princen, 1997) and some social scholars (Gorz, 1987; Iwata, 1997) elaborate proposals for more sustainable consumption and production patterns and levels based on self-sufficiency and consumptive restriction (Cohen, 2007). No doubt that eco-efficiency strategies should continue improving production processes and products. However, they need to be accompanied by changes in economic paradigms advocating continuous quantitative expansion of economy. There are natural limits to this kind of development and unless measures are taken, the global system will collapse. Instead of the economic growth, a system based on the natural limits and that aims at qualitative development needs to be devised. In the new system, societal norms and individual values should be geared towards personal and spiritual growth, social networking and consuming just enough. We need to strive for anti-growth and pro-development society based on sufficiency, efficiency and sustainability.

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Refereed Sessions II

Consumers (1)

Chapter 15 Creative Communities for Sustainable Lifestyles

Promissing cases of social innovation for sustainable ways of living in Brazil, India, China and Europe...

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1 Introduction

Within the next few years, we will have to learn to live (and to live better, in the case of most of the inhabitants of this planet) consuming fewer environmental resources. And we will have to do so by establishing new social undertakings at all levels, from the local to the planetary, giving rise to a new sense of proximity and distribution among the human beings inhabiting this small, dense, and today more than ever depleted planet. In our opinion, this is the working sense we should attribute to the concept of 'transition towards sustainability'.

The grounds for this statement are painfully evident to all (or, at least, to all those who do not close their eyes to reality). However, its implications might require further explanation, since they entail coming to terms with certain forms of systemic discontinuity in which, as a general rule, we are not used to thinking.

The concept of living well while at the same time consuming fewer resources and generating new patterns of social cohabitation is related to an idea of wellbeing (and, consequently, to a specific economic and industrial model) that is diametrically opposed to the one which industrialised society has engendered and propagated, to this date, throughout the world and which, put in a nutshell, can be expressed with the following equation: more wellbeing is equivalent to more consumption and less social quality. This pronounced difference proves a stark fact: it is simply impossible to take large steps towards sustainability if we limit our actions to improving

[1] Ezio Manzini wrote 1 and 6, François Jègou wrote 2 and 3, Lara Penin wrote 4 and 5.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

already existing ideas and ways of doing things. Each step towards sustainability must involve a systemic discontinuity with pre-existing situations.

How can this discontinuity be achieved? This is not the place for an exhaustive discussion on how complex systems evolve and, particularly, on how systemic discontinuities are produced. We will simply state—since this is the theoretical basis of everything that is discussed in this article—that the groundwork for great systemic changes, for macro-transformations, is done by micro-transformations, i.e. by the radical innovations introduced into local systems. We will also point out that recognising and observing these micro-transformations make it possible for us to get a first-hand glimpse of the new systems that, at a given moment, could stem from these changes.

Not to be abstract, we will introduce these ideas moving from a concrete experience: the results of the European research named EMUDE-Emerging Users Demands for Sustainable Solutions [2] and CCSL (Creative Communities for Sustainable Lifestyles)[3].

1.1.1 Diffuse social innovation

Let start form the observation of an interesting phenomenon of social innovation: the emergence in Europe of groups of active, enterprising people inventing and putting into practice original ways of dealing with everyday problems: from childcare and care of the elderly to getting hold of natural food; from looking after green spaces to alternative means of transport; from building new solidarity networks to the creation of new forms of housing and shared facilities and services … (for more, and more detailed examples, see: www.sustainable-everyday.net/cases).

This observation has been also the starting point of the EMUDE research. Moving form here, its initial hypotheses were that these *cases of social innovation* presented promising signals both from the aspect of environmental sustainability and, moreover, from that of social sustainability. And that these signals might usefully point a new direction for technological and market research and innovation.

The field study carried out by this research has verified the validity of these original hypotheses, has shed light on the characteristics of these

[2] EMUDE has been a Special Support Action promoted in the framework of the 6th Framework Program (priority 3-NMP) of the European Commission. EMUDE was coordinated by INDACO, Politecnico di Milano and developed by 10 research centres and universities and 8 European schools of design. EMUDE was concluded in April 2006.

[3] CCSL-Creative Communities Sustainable Lifestyles, promoted by the Sustainable Lifestyle Task Force, funded by the Swedish Government and endorsed by the United Nations Environmental Program. The project is part of the Task Force on Sustainable Lifestyles, within the United Nations 10 Year Framework of Programmes on Sustainable Consumption and Production, usually called Marrakech Process. CCSL ran from October 2006 to October 2007.

promising cases in the framework of contemporary society and has permitted to built scenarios that outline ways in which this promising phenomenon may evolve in future.

In particular, it emerged from the study that there exists a dynamic new form of creativity: a *diffuse creativity* put co-operatively into action by "non-specialised" people, which takes shape as a significant (though scarcely studied) expression of contemporary society. The EMUDE research has referred to these enterprising people with the expression: *creative communities, groups of people who invent sustainable ways of living*[4].

Creative communities. Creative communities are very diverse in their nature and in the way they operate. But they have a very meaningful common denominator: they are always the expression of radical innovations of local systems, i.e. discontinuities with regard to a given context, in the sense that they challenge traditional ways of doing things and introduce a set of new, very different (and intrinsically more sustainable) ones: organising advanced systems of sharing space and equipment in places where individual use normally prevails; recovering the quality of healthy biological foods in areas where it is considered normal to ingest other types of produce; developing systems of participative services in localities where these services are usually furnished with absolute passivity on the part of users, etc.

Moreover, all of these promising cases share another distinguishing feature: they are the outcome of the initiatives taken by individuals endowed with special design skills who set themselves specific objectives and find satisfactory tools to attain them; specially creative and entrepreneurial people who, without expecting to trigger general changes in the system (economy, institutions, large infrastructures), manage to reorganise the existing state-of-things producing something new.

Additionally, these creative communities have many common traits: they are deeply rooted in a place, they make good use of the local resources and, directly or indirectly, they promote new ways of social exchange. At the same time, they are linked to networks of similar initiatives being undertaken in different places, which enable them to exchange experiences and share problems at an international level (thereby turning them into cosmopolitan rather than merely local entities). Finally, and this is the aspect which most interests us here, they introduce new solutions that bring individual interests into line with social and environmental interests (which means that they have a high chance of becoming authentically sustainable solutions).

Emerging (implicit and explicit) demands. These creative communities and the promising cases they engender teach us a very important lesson: that

[4] A more precise definition is:

Creative communities: groups of people who, facing everyday life in the new urban environments, organise themselves to solve a problem or to open a new possibility. And, doing so, invent and practice sustainable ways of living.

it is already possible to take steps in the direction of sustainability. And they do this by offering us in advance specific examples of what could become "normal" in a sustainable society, fuelling up social debate and giving rise to shared views on this subject. At the same time they reflect, implicitly or explicitly, a demand for certain products and services, pointing to new market opportunities for the development of sustainable solutions.

The last statement has to be better explained. The promising cases that the creative communities are generating point to interesting lines for research and express the demand for a new generation products and services: the enabling technologies that could make these initiatives more accessible and more (environmentally, socially and economically) effective. For instance: experience of shared living facilities could become the starting point for a new generation of apparatus for totally new domestic and residential functions. Solutions that make a healthier diet and direct relations with producers possible could be stimuli for a new rationale in nutrition lines. Cases of localised production and self-production could spur the development of processes and products specifically conceived for this kind of de-centralised production. Experience of mobility systems alternative to the car monoculture, could lead to the development of alternative means of transport. And so on.

Weak signals of a (possible) future. Of course, these cases may be considered as minority and marginal. But this is a mistaken perception. On the contrary, they are the most promising aspects of great, on-going, social and cultural changes. In fact, they are based on, and motivated by, some profound *supporting trends* such as: demographic changes, the growing evidence of environmental limits, the on-going evolution towards a knowledge-based network society. In other words, the great changes that the on-going trends are generating are the ground on which a positively oriented *process of social innovation* (Young Foundation, 2006)[5] is emerging and will hopefully grow and generate the sustainable ways of living that we desperately need. However, we must add and underline that today, the possibility for this emerging social innovation process to grow and become a mainstream tendency is only potential, or better, it is an opportunity[6]. And that its realisation will depend on several interwoven factors.

[5] According to the Young Foundation: "*Social innovation* refers to new ideas that work in meeting social goals" (Young Foundation,2006). Another definition could be: "*Social innovation* refers to changes in the way individuals or communities act to obtain results (i.e. to solve a problem or to generate new opportunities). These innovations are driven by behavioural changes (more than by technology or market changes), which typically emerge from bottom-up processes (more than from top-down ones). If the way to achieve a result is totally new (or if it is the result that is totally new), we may refer to it as a *radical social innovation* (EMUDE, 2006).

[6] As a matter of fact, the same trends are also generating different, and very dangerous cases of social innovation: from gated communities to new fundamentalism, just to mention two. This means that nobody today can say what will be the result of the confrontation and composition of these different directions. What will really happen and how, at the end, the whole system is going to evolve is as yet unwritten. .

To sum up: fostering the transition towards sustainability is a question of establishing a 'virtuous circle' encompassing *social innovation* (which we recognise here in creative communities and in the new ideas and solutions they generate) and *technological and institutional innovation* (that can be implemented by the actors who, through their decisions, can advance the possibilities of success of promising proposals). On the other hand, setting up this virtuous circle requires first and foremost the development of the communication, design and strategic skills necessary to recognise, reinforce and transmit, in an adequate manner, the ideas and solutions generated at a social level, transforming them into original working proposals and endowing them with greater potential in terms of large scale dissemination, and to find ways to institute them in the most efficient manner.

2 Diffuse social innovation as a global phenomenon

Cases of collaborative everyday life creativity (the *creative communities*) are appearing world wide, from the mature industrial economies (as has been proved by the European research EMUDE) to the emerging ones. This was the starting point for the project CCSL (Creative Communities for Sustainable Lifestyles).

CCSL sought to compare some European experiences with ones that can be observed in the growing urban populations of emerging countries. In particular, three major topics were considered: (1) the nature of the groups of people who generate these innovations (the creative communities); (2) their role in promoting new and sustainable lifestyles (the promising cases) and (3) the possibility to make these promising cases more accessible, effective and replicable, thanks to some appropriate initiatives (the enabling system).

The original goal of the project CCSL was to enlarge and adapt the notions of creative communities and promising cases for new models of sustainable lifestyles at a world-wide scale. That is: from the meaning they have assumed in Europe – see the Emude research results, to the one they might have in other regions of the world, with a special focus on the emerging urban societies of the South and the far East.

In particular, CCSL has focused on the following questions:

- Considering creative communities in different countries: what are the similarities and differences between them? In particular: what can Europe learn from the emerging countries, and vice versa?

- Considering creative communities in emerging countries: do these cases indicate the direction for sustainable lifestyles? In particular: do they indicate sustainable lifestyles for the growing urban population of emerging countries?

- Considering creative communities as successful cases of grass roots innovation: how have they been improved and replicated? What kind of specific initiatives have been promoted?

- Considering the issues involved in improving and replicating such cases: could the communication and design capabilities that have been applied in some European cases be usefully adopted in the context of emerging countries?

CCSL has conducted research activities based on partnerships with local institutions: Technology & Social Development Laboratory (LTDS) at Rio de Janeiro Federal University (UFRJ) in Brazil; SRISTI/HoneyBee, The Society for Research and Initiatives for Sustainable Technologies and Institutions and the National Institute of Design (NID) in India (Ahmedabad); and Institute of Civil Society (ICS), Sun Yat-sen University and the School of Design, Guangzhou Academy of Fine Art (GAFA) (Guangzhou) in China.

Together with these partners and other experts organisations (NGOs, institutions and associations) and individuals, the project has enabled the formation of a first network of organisations and institutions interested in promoting collaborative creativity for sustainable lifestyles and confronting creative communities and promising cases focalised by the Emude research with local cases and experiences.

One of the original CCSL goals was to explore and adapt the creative communities concept to non-European contexts, taking into account that in Brazil, India and China, the terms “community”, “creativity” have meanings that are different, sometimes very different, from the ones adopted in the definition of creative communities in Europe.

We have indeed assumed that the term “creative communities” could be considered useful in spite of the different contextual interpretations of the terms. In fact, we have assumed in the beginning of the project (and later verified along the project development) that **in Brazil, India and China there are groups of people who organise themselves to solve everyday life problems or to open new possibilities in the new urban environments, and in so doing invent and practice sustainable ways of living.**

If this assumption is acceptable, as the initial working hypothesis, and it has turned out as a valid hypothesis, then we need an expression to name it by. That is, we need to name cases of grass roots innovation for collaborative, sustainable ways of living (where the emphasis is on the adjective “collaborative when referring to the process, i.e. the groups of people working in collaboration, and the expression “sustainable ways of living” indicates the motivations and the specific qualities of the results).

Given all this, we can assume that the expression *creative* can be used to distinguish them: “groups of innovative people who are inventing/managing

original solutions in emerging urban contexts", i.e. the new kind of initiatives we are searching for here[7].

3 Good Ideas Spread Worldwide

Creative communities and collaborative services are deeply rooted in their specific contexts, but their ***service ideas*** can spread worldwide. In practice, this means that, in different contexts, a ***service idea*** can be roughly the same, though its motivations and social meaning are very different from case to case.

To deal with the issue of creative community up-scaling, it is useful to introduce the supporting concepts of *collaborative service* and of *service idea*.

We have seen that creative communities are cases of everyday life collaborative creativity that generate ways to solve problems or to open new opportunities. In other words: they are organizations that produce results for all the participants, i.e. forms of service. For this reason we can call them: *collaborative* services. In other words: ***collaborative service*** **is a service that, to exist and to be effective requires some form of community.**

Every creative community, considered in its complexity, is by necessity deeply rooted in a local social and physical context. The same is true for the corresponding collaborative service. But for this service, as for every service, we can recognize and outline a kind of structure that is less context-specific and that is called the *service idea*. More precisely: ***service idea*** **is the system architecture and the partner positions and motivation that characterize a service and enable it to exist and, perhaps, be effective.**

The importance of the notion of service idea is given by the fact that it permits to separate what can be reproduced (because non context-specific), if the conditions are given, from what cannot be reproduced (as the creative communities and their related collaborative services).

By comparing creative communities cases collected in Europe and emerging countries (the results of EMUDE and CCSL projects), we have indeed verified, here and there, initiatives belonging to the same clusters of services, or service ideas (see Fig. 1):

[7] These very general statements cannot be made in the same way for all the countries considered. In fact, for instance, in India and Brazil, the expression "creative community" gives a name to initiatives that would otherwise risk being hidden in the shadows of the existing, in some ways similar but in many ways different, ones related to poverty eradication programmes and the development of under-developed communities.

In China, vice versa the situation is different from the Brazilian and Indian ones, and the similar expressions (relating to grass roots innovation for local development and poverty eradication) have not yet been consolidated. In this context, the introduction of the expression "creative communities" enables us to leapfrog directly to a concept map where the new phenomenon of innovative groups of people is specifically considered (in parallel with other initiatives that are in some ways similar, but also very different).

- **purchase groups**: groups of consumers who organise and manage the purchase of healthy and fresh produce in bulk, directly from producers;

- **community supported agriculture**: direct trade networks between producers and consumers, and a connection between urban and rural people, helping to sustain small-scale, organic agriculture;

- **urban vegetable garden**: groups of people who organise urban farming, raising crops in their backyards or in public areas, obtaining fresh produce and greening the city;

- **child socialization:** places for children to meet and play in an open-minded social atmosphere, often favouring interaction among parents and becoming a meeting place and reference point for the entire neighbourhood;

- **local exchange trading system:** mutual exchange of services, professional and non-professional skills among the members of a community;

- **community care for the elderly:** groups of senior citizens who can re-create their social circles, share everyday life tasks and get involved in productive activities;

- **community nursery** : small-scale home-based nurseries;

- **car-pooling:** alternative use of individual cars organised by groups of people who live or work in the same area, or who use similar routes in town.

Figure 1: Clusters of services ideas

This verification has led us to conclude that in emerging countries the new collaborative services are roughly the same as in most industrialised regions. Some of them appear to move freely between the two but, looking more attentively, we can observe that their motivations and social meaning change. In particular, the meaning of the term “community”, as used in the expression creative community, is very different from country to country (and also within the same country).

4 Creative Communities and micro-entrepreneurship

If in one hand, we observed that the same service ideas appeared equally in both industrialised and emerging contexts, on the other hand, something

different, specifically related to emerging contexts have appeared: cases linked to micro-entrepreneurship, revealing a new sub-system of grass roots social innovation in everyday life.

This finding causes an important change in terms of the point-of-view we have used so far to analyse Creative Communities cases: EMUDE has always looked at the cases from the final user point-of-view (*demand*). Now, for emerging countries, we have also to consider the point-of-view of the *offer*.

While in Europe creative community initiatives are mainly demand-based (emerging from a specific demand for services from the end-user), in emerging countries, a different mix of more supply-based motivations appears, emerging from the offer of specific services that groups of people organise and put forward on a micro-entrepreneurship basis.

In emerging countries, micro-entrepreneurship means small, localised, productive activities, which have a direct impact on the quality of life, offering a source of income that guarantees the inclusion of groups of people in the economy, conferring social quality and re-establishing the social fabric.

Moreover, collaborative services and micro-entrepreneurship are sometimes even opposed in emerging contexts and regarded as potentially competitive. Groups of people organizing on a private basis to co-produce a service for them selves are seen as a possible threat to employment. In India for instance, the dynamism of micro services pushed by overpopulation and unemployment in cities tends to discourage enabling solutions. In China (as well as in many other countries) collaborative initiatives such as car-pooling are regarded as illegal competition to public services.

In fact, not all cases of micro-entrepreneurship in emerging countries can however be considered as creative communities, opening up a grey area, a blur between near but different concepts. In Brazil, India and China, the expression “creative communities”, when explained as *grass roots social innovation*, is often considered as a part of other, existing and relatively consolidated arenas of discussion and fields of actions:

- *The development of under-developed communities*. In this case the common denominator with our concept of creative communities is the collaborative dimension. But the communities being considered here are mainly traditional ones, and the contexts where these actions take place are mainly rural (such as villages in India) or very poor (such as the Brazilian *favelas*). In China this interpretation does not appear to be so diffused and consolidated.

- *The promotion of new (profit and non profit) enterprises*, meaning the results of the creativity and entrepreneurial capability of individual people. In this case, the common denominator with our concept of creative communities is the high degree of entrepreneurship in solving the problem. But here the focus is on individual capabilities rather than on the capabilities of groups of

people who collaborate to solve common problems as occurs in creative communities,

- *The promotion of charity-oriented organisations,* meaning organisations where someone voluntarily does something for someone else. In this case, the common denominator with our concept of creative communities is the promotion of social value. But here the relationships mainly consist of someone helping somebody else who is in difficulty, without demanding anything in return. Instead, in creative communities, relationships are based on some form of reciprocity where everyone involved is active in different ways.

The inclusion of micro-entrepreneurship as one particular modality of creative community in emerging contexts must thus pass through some of the main filters that characterises creative communities. As already said, reciprocity is one such characteristics, leaving out from our framework, initiatives based on charity approach. Reciprocity means that all actors involved have something to offer but also something to benefit from a specific solution. Another aspect is that of enhancing social quality through some form of collaboration, i.e. collaborative services, a service that, to exist and to be effective, requires some form of collaboration within a given community.

In this framework, it is important to interpret the micro-entrepreneurship within contextual conditions and circumstances. In Brazil for example, micro-entrepreneurship is often connected to existing networks and supporting initiatives from civil society organisations working through some community-based approach. Social incubators[8] and other initiatives based on the solidarity economic approach have an important role in encouraging and supporting micro-entrepreneurship and community-based solutions aiming at re-establishing social fabric and well-being.

4.1.1 The meaning of "community" changes deeply in the different contexts.

In the European experiences the communities we refer to are "intentional communities": new social organizations emerging from a long process of individualisation (and, largely, as forms of reaction to it).

Vice versa, in emerging countries, the communities we refer to can be seen as a balance between continuity with still existing traditions (families, villages, neighbourhoods, etc.) and the innovation needed to face radically new conditions of life (and the challenges of sustainability). In each country, this balance can be different, but in each one of them it will result in the up-dating of traditions, i.e. the use of traditional social organisations as building

[8] Social incubators are a modality of incubators finalised at supporting micro-entrepreneurs organised as cooperatives, stimulating in this way income generation initiatives, but also favouring social aggregation in a given community. Social incubators offer micro-entrepreneurs a physical space, organisational support, capacity building and frequently focus on local development of specific neighbourhoods or social groups.

blocks for new forms of social network (in the framework of which collaboration, mutual help, sharing and, more in general, community building can be up-dated and re-interpreted).

A second consideration can be made regarding the *socio-cultural meaning* of these initiatives in their own contexts, by local experts. And this is related to the very interpretation of the terms, the meaning of the terms *creative communities*, *social innovation* and *sustainable lifestyles*.

Community is the most critical term. In Brazil, *community* has been recently used to replace the word "favela" (shanty town), for politically correctness purposes: *"…the sense of community in Brazil is different due to this recent erroneous use of the word to replace 'favela'."* (R. Bartholo, UFRJ, Brazil, pers. comm. 05/02/2007). In India, *community* tends to have a connotation of traditional rural communities, as well as referring to one particular religious faith. In China, there are different historical interpretations, including the delimitation of an administrative area by the government (Alice Lau, ICS, China, pers. comm. 24/01/2007). However, with the growing public interest in the issue of civil society, it is now starting to appear in public debates with an apparently similar meaning to that used for creative communities i.e. *intentional communities* that emerge in the crisis of traditional ones, against the general background of individualization that is spreading in China too.

Collaborative creativity. The same kind of comparison can be made regarding creativity and therefore, the understanding of the proposed concept of *creative communities*. In all 3 of the countries considered, the traditional meanings are now influenced, at least in public discussions, by the western meaning of the term, where creativity is seen as a positive resource from the point of view of promoting a knowledge economy. The discussion of the role of creativity in contemporary society (and in a knowledge economy) is today very diffuse world wide (and in Brazil, India and China too). However, it has to be said that the notion of creativity normally used in these discussions is quite far from the one we adopted when defining the concept of creative communities. As we have written in the previous paragraph, as far as creative communities are concerned, the creativity we are referring to is not the creativity of experts (i.e. workers in creative industry) but it is the *diffuse creativity* that characterizes contemporary societies when oriented towards inventing collaborative solutions to everyday life problems and opportunities[9].

Particularly in India and Brazil, experts have pointed out for one of the possible reasons of this different interpretation, basically related to the understanding of creativity as an individual quality rather than a collective one. In India, (social) creativity is commonly linked to the notion of "juggard" (copy/hack culture) (A. Srinivasan, IIT Delhi, India, pers. comm. 02/03/07), which demonstrate a strong individual creativity but tends to stick to the "fix-it" level (S. Mehta, NID, India, pers. comm. 06/03/2007) and

[9] The Emude research has proven that the creativity of professional creatives, and that of creative communities are different. Nevertheless, it proved also that creative communities can generate a favourable context for the development of professional creativities.

therefore very much referring to grass roots inventors (Honey Bee, India). In Brazil, "the notion of *creativity* has been given recently an individualistic emphasis: *creativity* as an attribute of the individual freedom"(R. Bartholo, UFRJ, Brazil, pers. comm. 05/02/2007).

Cases of social leapfrogging. In emerging countries, collaborative behaviour patterns still exist in different traditional forms (inside families, villages, neighbourhoods, etc). At the same time, main stream thinking on modernization, following the patterns of existing mature societies, considers that these living traditions are condemned to disappear, swept away by an "inevitable" individualization process.

On the contrary, through the *creative communities* perspective, we assume a different idea of modernization, where new forms of cooperative behaviour, creative communities, appear as cases of *social leapfrogging*. That is, as cases of social innovation where groups of people move directly (or, in any case, very fast) from traditional forms of collaborative behaviour to new ones, responding to the needs of contemporary everyday life (avoiding the phase of extreme, unsustainable individualisation that characterizes existing mature industrial societies).

Visions of better ways of living. We have assumed that in emerging countries, creative communities can be seen as a non linear evolution towards modernization, i.e. cases of *leapfrogging in the social development process*. However, these "leaps" require some ideas on where to leap: a new idea of wellbeing that must be perceived as better than the one achieved through a more linear process. If this is true, the kind of wellbeing that creative communities generate has to be perceived as better than that proposed by the normal "modern" solutions [10]. This means that this community-based and context-related wellbeing must be attentively and effectively communicated. And wider visions of what life could be like, if it were widely accepted and diffused must be produced.

In other words: effective communication and scenario building are crucial to give these promising cases the possibility to last over time and to spread. New design tools and new sensibilities must be developed to make it possible.

Anticipations of sustainable lifestyles. For many years in emerging countries, cases of grass roots innovation have been seen, *mainly* as a topic to be dealt with in association with rural village economies and/or of poverty alleviation.

On the contrary, in the CCSL perspective, we look at them in terms of *creative communities*, i.e. in terms of collaborative everyday life creativity that may anticipate possible sustainable lifestyles in urban environments.

[10] We must add here that, today, the perspective of creative communities must also be perceived as better than another (very dangerous) existing proposal: the one based on ultra-conservative ideas on identity and traditions.

Social And Environmental Implications. Creative communities are promising cases of social innovation towards sustainability. In fact, by solving some everyday life problems collaboratively, they propose and put in practice ways of living which have a positive social impact and, generally speaking, a reduced environmental footprint.

In the emerging countries the implications of creative communities require further analyses and discussions. On the social side, the discussion focuses on the meaning of modernization: creative communities are associated with an idea of modernity that is not the mainstream way of thinking either in emerging countries or in the most industrialised ones,. On the environmental side, the implications of creative communities must be analysed in depth and this must be done in a systemic way. Moving from here, clearer directions on how to improve the creative communities' environmental potential have to be outlined.

Technology And Design Can Help. In order to gain support creative communities must be recognized, reinforced and communicated in an adequate manner. In addition, their accessibility, effectiveness and long term survival must be facilitated by appropriate sets of products, services and communication programmes (the enabling solutions).

In the emerging countries, technology and design can help in enabling new creative communities to emerge, to become more accessible and effective and, finally, to spread. Appropriate enabling solutions and supporting platforms have to be conceived and developed, bearing in mind the local specificities and the global opportunities of experience exchange. A new generation (and a new market) of enabling products and services will appear.

5 Enabling systems: mainstreaming the promising cases

The CCSL project results suggest that creative communities and grass roots social innovation for everyday life can become core elements of new possible sustainable lifestyles in emerging countries, contributing to the improvement of the quality of life and favouring social leapfrogging. How does this insight affect the policy agenda?

A few critical points appear as essential for determining policy recommendations.

The first, derives from the very nature and spirit of this social phenomenon, embodied by the initiatives identified and analysed along the research, i.e. collaborative services. These collaborative services are mostly the result of bottom-up initiatives, but at some point can be structured by **a top-down framework** that will concur to provide guarantees for further development, the spread and mainstreaming of this kind of initiatives.

Top-down interventions shall occur to establish an operative framework within which creative communities promoters and users (which can be the same) find the necessary guarantees to adopt these as everyday life services. If we take for example micro nurseries found both in Milan, Italy (case *Nidi in Casa – Nurseries at home*) and in Rio de Janeiro Brazil (case *Creche Comunitária Mundo Infantil*), the responsibility of the children safety, hygiene conditions, adequate care, the punctuality of the service, etc are serious issues that require the backup of an institution that guarantees its quality, requiring thus top-down measures.

These top-down measures must thus be able to establish conditions for *trust* among promoters/users of a collaborative service.

A second critical point appears related to the kind of **flexibility that new governance tools shall have, balancing tolerance and control.**

If we take for example the car-pooling practice in China or Brazil, we observe the difficulty on establishing this balance. In China, car-pooling has been a rising popular alternative to urban mobility in cities suffering with increasing traffic-congestion (case *Pinche*). As a new phenomenon, the practice finds a legal bottleneck, since it is not foreseen in the current regulations.

The modalities of the practice can vary from car-pooling among friends or neighbourhoods to a real business, and in this case there are no regulations whatsoever to avoid tax evasion. With no control at all, such a practice might become just a way to evade taxes. But, if because of this risk the authorities ban the whole practice of car-pooling, then it will also refrain more sustainable and less harming car-pooling modalities to appear.

In Brazil, where car-pooling is also diffused (case *Carona Solidaria*), two opposite situations have appeared. One, similar to China, is the diffusion of private car owners acting as collective taxis, without any form of control whatsoever, no taxes being paid, no control of security conditions or pollution emissions of the cars and above all, no resonance with cities overall strategies for urban mobility. The second situation, is how the practice of “giving someone a ride”, whether among people that live and work in nearby areas, mothers driving their children to school or university students sharing the ride and costs of fuel, has evolved into a enabling platform, promoted by local authorities. The municipality has developed a software to enable people organise the rides. How this platform will catch up is yet to be seen, but it can be a good example of how public administration has taken the lead to promote a collaborative service, through an **enabling system.**

The role of local authorities (and business) can be therefore that of creating and implementing enabling systems, able to stimulate and give support to collaborative services and at the same flexible enough to balance the limits between tolerance and control.

In synthesis, the conceptual key to delimitate the policy intervention regarding collaborative services and sustainable lifestyles is that of enabling systems. This conceptual key can be articulated at different levels:

- To legitimate control
- To integrate the lack of trust

Furthermore, the Enabling Systems have the quality of reducing the threshold to start one such initiative, facilitating the organisation and implementation of a collaborative service, enabling results to be achieved in an easier way, surpassing difficulties at the organisation level.

6 The designers' role

Given this general framework, we can now discuss the role that could be played by design in this process. Take the idea of the virtuous circle earlier described: surely design should use design-specific skills to be actively involved in the establishment of this circle: giving visibility to promising cases, highlighting their most interesting aspects; drawing a map of the existing state-of-things and building scenarios of potential futures; interpreting the questions which arise more or less explicitly, from promising cases; conceiving and developing systems of products, services and information to increase their efficiency and accessibility.

If this is, in a nutshell, what design should do, then the next question we can ask is whether design is capable of carrying it out. If we assume that it is, in order to play this role, design must update its traditional cultural and functional legacy. Moreover, the very idea of what a designer is in our day and age must change.

In this new context, designers have to be considered, and have to be consider themselves, as social actors in a society in which, as contemporary sociology points out, "everybody designs" and in which a host of active minorities, the creative communities, are inventing new ways of being and doing things. In particular, designers have to accept the fact that they can no longer aspire to a monopoly on design and that today design is not only executed in design studios, but everywhere.

At the same time, they have to understand that they will continue playing a specific, and very important role. Moreover, designers have to understand that it is precisely because contemporary society is the way that it is that the role of design, and of the design practitioners, acquires even greater importance. In fact, designers can come to the fore in the great "diffuse" design arena, becoming "solution promoters", bringing their specificities, such as their capacity to produce *visions of the possible* (i.e. the ability to imagine something that does not exist but could potentially exist) and to develop *strategies to materialise them* (i.e. concrete steps to transform potential visions into real solutions).

Design for social innovation. A new, different and fascinating role for the designer emerges from what has been said here. A role that does not substitute the traditional one, but that works alongside it opening up new fields of activity, not previously thought of.

The first step on this ground is to take the social innovation as a kick off point and use designers' specific skills and abilities to indicate new directions for product and service innovation (in practice this involves moving in the opposite direction from that more frequently taken by designers i.e. where, starting by observing a technical innovation the designer proposes products and services that should be socially appreciated).

The second step designers must make is to consider themselves part of the community they are collaborating with. To be and act as experts participating peer-to-peer with the other members of the community in the generation of the promising cases they are working on, and their evolution towards more efficient and accessible systems.

These guidelines have important implications not only for designers' practice, but also and even more, for the vision that they have of society and of themselves (in society). Moving in this direction, designers have to be able to collaborate with a variety of interlocutors, putting themselves forward as experts, i.e. as *design specialists*[11], but interacting with them in a peer-to-peer mode. More in general, they have to consider themselves part of a complex mesh of new *designing communities*: the emerging, interwoven networks of individual people, enterprises, non-profit organizations, local and global institutions that are using their creativity and entrepreneurship to take some concrete steps towards sustainability[12].

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[11] Social actors endowed with specific *design knowledge* and specific *design skills*: the knowledge that enables them to understand the full, macro-picture of how things have changed (and are changing), and the micro one, of local context characteristics and on-going dynamics; the design skills that are required to promote and enhance co-design processes in the new contexts and facing the new challenges.

They are *design specialists* in that they use design tools to facilitate the convergence of different actors towards shared ideas and potential solutions: proposing solutions and/or scenarios; formulating effectively whatever emerges from the collective design group discussions; developing the ideas on which partner convergence has been verified.

[12] The notion of *designing communities* emerged in the final consideration of the EMUDE research results (EMUDE 2006). The theatrical and practical background was also given by other important lines of research, such as the ones developed by Pierre Lévy, on *collective Intelligence* (Lévi, 1994), or by Hilary Cottam and Charles Leadbeater of *open services* in the framework of the wider phenomenon of the *open source movement* (Cottam, Leadbeater, 2004).

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Chapter 16 Intelligent replacement - making optimal use of household appliances

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1 Introduction

Electric and electronic equipment has been identified as a major and increasing contributor to household energy consumption. To make consumption more sustainable, optimal use should be made of this equipment. With increasing energy efficiency of products, replacement of appliances can contribute to energy saving (CECED 2006). On the other hand, rapid replacement increases total environmental burden due to increased resource consumption. The balance between these two trends is not easily assessed and costs and benefits of replacement might be different from the point of view of an individual consumer and of society as a whole (Rüdenauer et al. 2004). An intelligent replacement strategy therefore has to include several aspects: the determination of the optimal lifespan of an appliance, information of the consumer on the costs and benefits of replacement, including offer of repair services to avoid unnecessary replacement, costs and benefits of placement of discarded products on the same or different markets via reuse enterprises.

In this paper, we want to discuss the effects of different reuse and replacement strategies using a simple stock model, and draw some conclusions from the modelling results on how a reuse sector for household appliances should be organised.

2 A simple stock model

2.1 Effects of replacement and reuse on energy consumption

To evaluate the effect of reuse on the energy consumption of a whole stock of appliances in use, a simple general model has been used to quantify energy and resource consumption over time for different reuse and replacement strategies. The model uses a constant stock of 1.000 appliances with a given mean lifetime, a mean resource consumption for production and a mean energy consumption during use (Table 1).

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

Table 1: Parameters used for the basic energy consumption model

	units	Value
Initial stock	Pieces	1.000
Mean lifetime	Years	10
Energy consumption per unit	(arbitrary) energy units	100
Resource consumption per production of unit	(arbitrary) resource units	10
Percentage Replacement	% / a	50
Percentage Reuse	% / a	25
Energy consumption per replacement unit	(arbitrary) energy units	50

Initially, the stock of appliances is in a steady state, replacing old appliances with new ones of the same quality so that the given mean lifetime of an appliance is maintained. For the model calculations, a change in replacement strategies is introduced in year one and the development of energy consumption over time is calculated.

Some basic results can be obtained without model calculations. Introducing reuse in such a steady-state model simply means to modify the mean residence time and therefore saving resources according to the reduced production necessary for replacement. If. e.g. 10% of the appliances are reused for another five years, resource consumption will be 5% lower, while energy consumption remains the same.

Similarly, if old appliances are replaced by more energy-efficient ones, the new steady state will be one with according lower energy consumption, but this time the development of energy consumption over time depends on the replacement strategy chosen.

In Fig. 1, the lower set of curves shows the time series when it is assumed that all input into the existing stock comes from more energy-efficient appliances, thus assuming that the old ones are no longer produced. In this case, reuse will slow down the replacement process, because the annual input of new appliances is reduced. If we assume that 25% of all appliances discarded in a given year (whatever their efficiency) are reused, after ten years only 55% of all appliances in stock are energy-efficient, instead of 61% in the replacement case. The effect will of course level off when all old models are finally replaced.

A different situation might occur if the more energy-efficient appliances have to compete with the old, maybe cheaper ones. If we assume that only 50% of the necessary annual replacements are done with the new type, possible developments are shown in the upper set of curves in Fig. 1. The decrease in energy demand is generally slower than in the case of enforced replacement, but now, the effects of reuse can be different. If only old, less efficient appliances are reused (because e.g. the new ones are no longer repairable), then the decrease of energy demand is further slowed down. On the other hand, if reuse concentrates on the new, more efficient appliances, then the introduction of the new appliances will be accelerated, because a certain part of the input, which would otherwise come from less efficient appliances, is now replaced with reused more efficient (and probably equally cheap) appliances. Therefore, in the competition case, the two reuse curves represent the best and the worst case, and every time development between the two curves is possible.

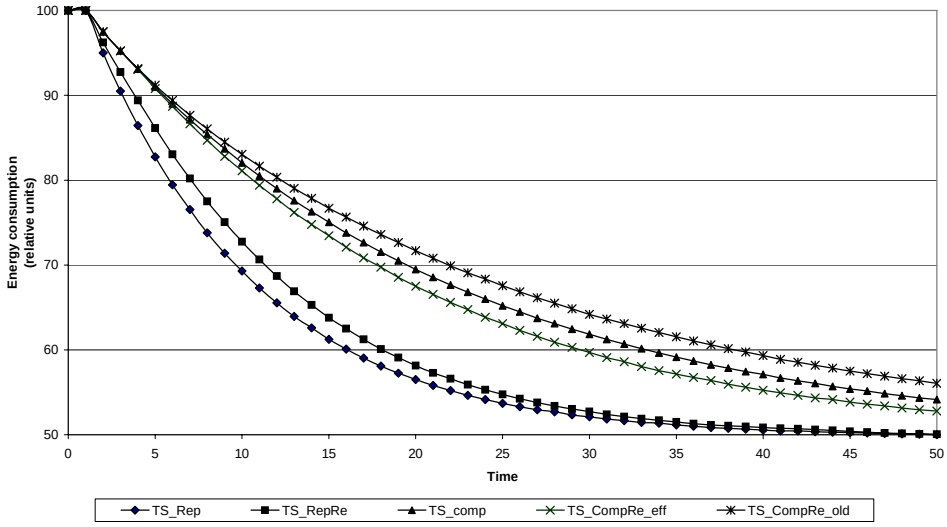

Figure 1: Energy consumption of total stock of appliances
Lower set of curves: All necessary replacements are done with energy-efficient new appliances. TS_Rep: Replacement without any reuse, TS_RepRe: Replacement with reuse irrespective of appliance type.
Upper set of curves: More and less energy-efficient appliances compete for replacements. TS_comp: Replacement without any reuse, TS_CompRe_eff: Replacement with reuse only of energy-efficient machines, TS_CompRe_old: Replacement with reuse only of old machines.
All other parameters as in Table 1.

For white goods like washing machines or refrigerators, but also for most brown an grey goods like TVs or PCs, the competition model is probably more realistic than the replacement model. Only when a new and much better technology is introduced, as e.g. the LCD monitors for PCs, the replacement model might be more realistic. So even this simple example leads to the conclusion that the choice of the reuse strategy is of critical importance to judge the consequences for energy demand of the total stock of appliances, and it is not necessarily true that reuse will slow down the introduction of more energy-efficient appliances.

Going one step further into details, we split the existing stock of appliances into three energy efficiency classes, as given in Table 2, so that the mean energy consumption of the total stock remains the same. Each efficiency class shall make up 1/3 of the total stock (with class B containing one unit more, to maintain the total number of 1.000). All other model parameters are taken from Table 1.

Table 2: Energy consumption per efficiency class

Efficiency Class	units	Value
A	(arbitrary) energy units	75
B	(arbitrary) energy units	100
C	(arbitrary) energy units	125
Replacement unit, A+	(arbitrary) energy units	50

Now, several replacement and reuse strategies are possible. The effects of a few are shown in Fig. 2.

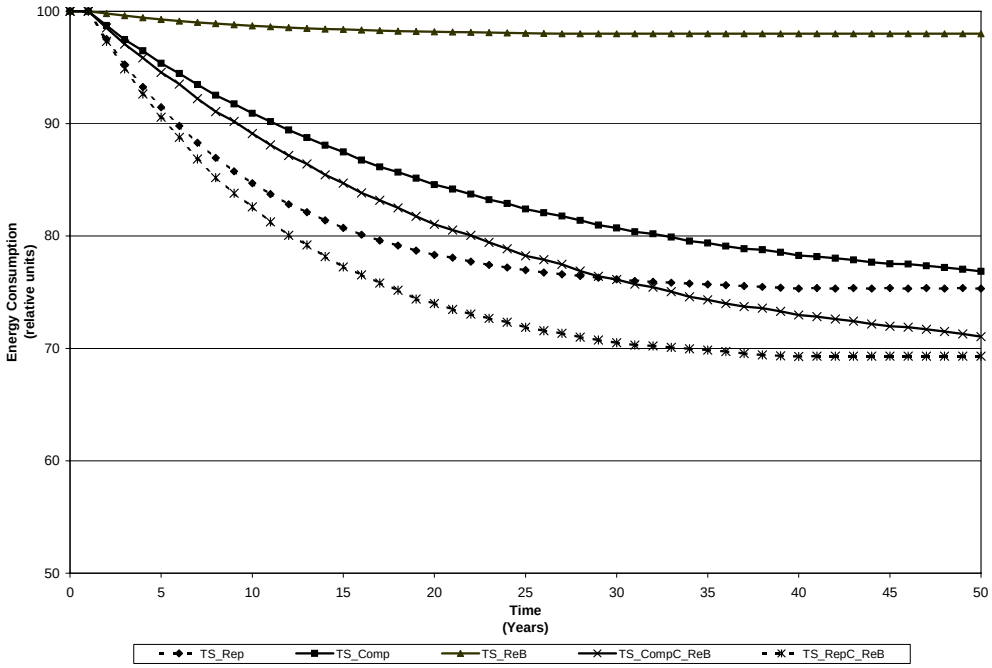

Figure 2: Energy consumption of total stock of appliances with different energy efficiency classes.
TS_Rep: Replacement of least efficient appliances without any reuse,
TS_Comp: Competitive Replacement of least efficient appliances without reuse.
TS_ReB: Reuse of class A appliances replacing class B,
TS_CompC_ReB: Combination of Competitive Replacement of least efficient appliances and Reuse of class A appliances replacing class B,
TS_RepRe_ReB: Combination of Mandatory Replacement of least efficient appliances and Reuse of class A appliances replacing class B.
All other parameters as in Table 1.

If we choose to mandatory replace only the least efficient appliances (Class C, using 125% of the mean) with new, most efficient ones (Replacement units A+, using 50% of mean), we end up with 75% of the original total energy consumption. If the new, efficient appliances have to compete with the old ones, the replacement process is again slowed down considerably. (In reality, A+ models will not compete directly with class C models, and one has to take into account internal shifts within classes, but for the sake of simplicity and comparability, the original assumption is maintained.)

As an example for a pure reuse strategy without any replacement with new models, the case of reusing only class A appliances, which then replace discarded class B appliances, is shown. In this case, a small reduction of total energy consumption (2%) is reached, due to a shift in number of

appliances between classes A and B (41% and 25%, resp., instead of 33% each).

Combining the two strategies, i.e. competition between Classes C and A+ and reused class A and A+ appliances replacing class B appliances, results in a decrease in energy demand which is initially slower than the pure replacement strategy, but leads to lower consumption levels in the long run. The optimum within this set of strategies is of course the mandatory replacement of class C appliances while reusing A and A+ appliances to replace class B.

2.2 Effects of replacement and reuse on resource consumption

Up to now, we have only considered the effects of different replacement and reuse scenarios on energy consumption during the use phase. But whenever the lifetime of appliances is elongated, there are additional savings of energy and material resources, because less appliances must be produced to maintain a certain stock. The model described in section 2.1 is easily extended to calculate the mean annual resource consumption as well as the mean resource consumption over time, if the mean resource demand for the production of one unit is given.

For the present purpose, we will discuss only relative changes in resource demand, assuming an arbitrary value of 10 “resource units” (including energy and material resources) for the production of one appliance unit. Therefore, to maintain the steady state stock of 1.000 appliances with a mean lifetime of 10 years, 100 appliances have to be produced each year, consuming 1.000 resource units. When 25% of the annually discarded appliances can be reused for half the “first lifetime” of the appliances (i.e. 5 years), then 12.5% of the resources for production can be saved.

For the scenarios shown in Fig. 2, where reuse and replacement is involved, the savings are higher, reaching 15% in the new steady state of scenarios “TS_RepC_ReB” and TS_Comp_ReB”. Because the resource consumption declines over time while the amount of reused appliances increases, the mean resource consumption over the time to reach the new steady state is slightly higher, leading to mean annual savings between 10 and 11%.

2.3 Conclusions from the model results

The most important general conclusion that can be drawn from the modelling results presented above is, that replacement and reuse strategies can be combined to yield savings of energy as well as of resources.

When no mandatory replacement of discarded old appliances with more energy-efficient new ones is possible, intelligent reuse strategies can promote the penetration of more efficient machines into stock when the competition between efficiency classes is properly organized.

As can be seen from the calculations, it is not only important which appliances are chosen for reuse, it is also important to look at which appliances they will replace. This means that the targeted markets influence the decision on reusability of a given appliance. When it is assumed that most consumers decide depending on the purchase price of a product, reused appliances can be positioned to successfully compete with less efficient,

cheap new products and thus deliver higher environmental benefits, even when this is not important for the consumer.

Resource savings of 10 – 15%, which are calculated here for pretentious, but nevertheless realistic reuse targets (25% of the total amount of discarded products), are significant, even if more resources can be recovered via recycling processes (Truttmann and Rechberger 2006). Reuse and recycling do not contradict each other. Reused products are not kept away from recycling, but are retained in use for a elongated period, after which they are recycled in just the same way.

3 Extending reuse strategies

3.1 Improving product quality

In the above calculations, it was assumed that reused appliances retain their original functional characteristics and especially their energy efficiency. Critical analyses of reuse activities (Dewulf et al. 2005, Devoldere et al., 2006) argue that deterioration processes have to be taken into account. On the other hand, the reuse process can be organized such that the original efficiency is retained or even increased.

When products are reused, the minimum requirement is to retain the original function (washing clothes, displaying pictures, etc.). Since reuse centers are usually obliged by law to give a certain warranty, they usually check their appliances for the normal sources of failure. But beyond that simple reuse, it is usually possible to bring the appliances back to their original state or even improve their performance. Examples for improving household appliances like washing machines have been given by Behrendt et al. (2004) or RUSZ (2007).

For many product groups, remanufacturing is already a profitable practice (Statham 2006, Parker and Butler 2007). Remanufacturing is defined as "…the process of returning a used product to at least OEM performance specification …". It usually includes dismantling, cleaning, component inspection and repair or replacement of damaged or worn parts, assembly and test and is therefore a labor-intensive activity. For household appliances, the necessary processes are developed (e.g. Anderson 2001), but are not regularly employed due to a number of reasons (Bröhl-Kerner 2006). To overcome some of the major constraints for reuse, a basic requirement is to establish a sufficient relation between producers and reusers, which would ensure the necessary flow of technical information and could give credit to the quality of reused products expected by consumers. With the implementation of the European directive on Waste from Electric and Electronic Equipment and the priority for reuse stated therein, first steps to establish such relationship are taken e.g. in the UK and France, but are lacking in many other European countries.

3.2 Extending markets for reused products

Traditionally, besides small private markets with direct sales from the last user, reuse markets for household appliances often developed on local scales, involving projects to reduce waste and create jobs for unemployed people in collection, sorting, repair and dismantling of WEEE and to provide cheap appliances for people depending on social welfare. From these

projects often social enterprises emerged, providing environmental services in the management of different waste streams as well as social services in offering jobs and training for people in need. Selling cheap quality products in own warehouses, they often contribute significantly to the local economy.

From a customers point of view, a major hindrance to buy second-hand appliances is the low reputation of these products. To overcome such prejudice, it is important to implement and communicate high quality standards and to delimit qualified reuse from "sold-as-seen" practices, dominating the "gray" markets. This is one of the reasons why it could be important to introduce a mechanism of accreditation of reuse centers, which together with proper quality management and certification could give them more credit in the public opinion.

3.3 Making reuse and repair economically feasible

Besides being a labour-intensive activity, one of the main economic problems of reuse and repair of products is the unavailability of sufficiently cheap spare parts. Thus, making cheaper spare parts available would promote not only reuse of discarded appliances, but could also promote repair of products still in use and thus help to reduce unnecessary waste production.

That is why there is a close connection between waste prevention by keeping products in use, waste minimisation by reusing discarded products, and dismantling products for recovery and recycling. Reuse centres can play an efficient role in the management of WEEE, when they are able to integrate all these functions, i.e. offering repair services to owners who want to keep their products in use, reusing discarded products out of the municipal or commercial waste streams, and producing necessary spare parts by properly dismantling appliances which can not be reused. Integration of all these function can enhance the profitability of the reuse centres themselves and can promote maintenance and repair services in the wider economy by providing cheap spare parts.

Given the local character of most repair and reuse activities, an important question is how these services can be supplied on a sustainable basis. Henseling and Fichter (2005) have shown, that online markets in general have a great potential for sustainable trade of second hand products. For spare parts, online shops have been successfully established for the automotive sector, and first attempts were started for white goods (ETN 2007).

3.4 Integrating reuse into product-service systems

With at least part of reused products targeted at consumers with low income, there are additional chances to contribute to energy savings and efficient use of electric and electronic appliances.

To be successful, low-income energy efficiency programs usually do not only need to provide sufficiently efficient hardware, but also additional services as e.g. information on the correct use of appliances and consumables (York et al. 2008). Many local projects have shown that such services can be provided by reuse centres or other non-profit organisations (Jonuschat and Scharp 2005), but are difficult to organise otherwise.

Therefore, it can be a successful strategy to empower reuse centres not only to sell appliances, but also to provide their customers with all necessary means to make full use of the products.

4 Conclusion

Reuse of household appliances, especially of electrical and electronic equipment, can contribute to more sustainable consumption. To exploit this potential, it is crucial to develop the reuse sector with regard to its public reputation, its quality standards, its legal base and its integration into waste management systems.

Properly organized, reuse activities are not in conflict with the targets of saving energy and protecting the climate, but contribute significantly to more sustainable resource use.

New business models, such as product-service-systems including reused products and extended repair offers using reused spare parts can help to extend the market for reused products.

In this way, a consumer sector, which is not easily reached by usual strategies to promote sustainable consumption, can be successfully targeted.

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Chapter 17 "Key points" of sustainable consumption

Focusing sustainability communication on aspects which matter AND appeal

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1 Introduction

It is not only the international bestseller "Change the world for a fiver" that shows that consumers obviously have the desire for advices how to make their personal contribution to sustainable development. Sustainability communication can build on this. Our paper intends to give recommendation for the practice of sustainability communication; recommendation to the consumers but foremost to those translators within public authorities and civil society who transfer scientific insights into practical advice for individual decision making. The message developed in this paper is twofold. First, it doesn't do too much good providing all sorts of advices for sustainable consumption in the same manner regardless if they target "big points" of consumption which largely matters from the sustainable point of view or if they deal with marginal "peanuts" only. Second, also praying the "big points" will quite likely miss the target if they are incompatible with the willingness and ability for consumers to change. As a solution we introduce the concept of "key points" of sustainable consumption which should be placed at the centre of communication measures. "Key points" are those "big points" which most likely will fall on fruitful ground in consumer communication.

The paper is based on two studies. The first analysed different books, booklet and brochures with (environmental) consumer advice. In the second study semi-structured interviews were conducted among selected environmentally aware consumers. Chapter 2 describes the increasing attention for the "big points" in literature. Chapter 3 explores the theoretical considerations for the identification of "key points". In chapter 4 we introduce nine principles we regard as crucial for a successful sustainability communication. Chapter 5 summarise findings and message.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

2 Setting priorities

There is clearly no shortage of advice for sustainable consumption. However, there is a shortage when it comes to realising and fostering sustainable consumption by individual consumers: the money and time for it are scarce and very often the willingness to leave much-loved products on the shelves, and to change longstanding consumption behaviour is lacking. In environmental and sustainability research in social sciences much insight has been gathered so far on *why* and under which circumstances people consume (un)sustainably (see e.g.: Kaufmann-Hayoz 1996; Homburg and Matthies 1998; Røpke 1999; Sanne 2002). Likewise, many studies describe how to put across individual advices for sustainable consumption (see e.g.: Gardner and Stern 1996). An independent research discipline has been established to treat this specific question under the title of "sustainability communication" (Adomssent and Michelsen 2006).

Sustainability communication – and therefore consumer policy as a shaper of sustainability communication – is facing the same conflict as consumers do in their daily lives: a multitude of advices for sustainable consumption are confronted with limited resources of money, time and interest. The multitude of advices is causally linked to the understanding of sustainable consumption as such. Sustainable consumption commonly describes consumption patterns which reduce negative social and environmental impact during processing and consumption as compared to conventional consumption patterns without unduly reducing the individual net benefit (Belz and Bilharz 2007, p. 27). The characteristic resulting from this definition of sustainable consumption is a *relative* improvement compared to the current state of unsustainable consumption. Consequently, each individual (!) act of consumption has at minimum (!) one sustainable consumption alternative. As a result, a number of sustainable consumption alternatives arise that is scarcely manageable. The scope of the social and environmental improvements that these alternatives incorporate is very wide. Alternative concepts of mobility such as car-sharing as well as luxury automobiles that forgo the use of tropical woods for their dashboard can both be subsumed under the above definition.

The concept of sustainable consumption has been intensely used to describe what *can* be done. Now it is urgently necessary to limit the multitude of options with regard to what *needs* to be done with a high priority. Given the multitude of well substantiated "excuses" why consumers follow these (often marginal) advices but ignore other (more sustainably relevant) it appears to be sensible to focus on "things that really make a difference" (Brower and Leon 1999, p. XI; Spangenberg and Lorek 2002). If consumers do not want or are not able to do everything, they should start by doing the most relevant first. It is hardly fruitful to spread limited individual and collective resources across a large number of options which have a marginal or at least doubtful contribution to sustainable consumption. And it is the task of research to point out what the most relevant is as well as the task of relevant and interested civil society organisations to concentrate their advices on the relevant.

In order to foster sustainable consumption, academic literature has started to increasingly discuss and demand the prioritising of advices to alter consumption patterns (Lorek, Spangenberg and Felten 1999; Brower and Leon 1999; Gatersleben 2001; Lorek and Spangenberg 2001; Spangenberg and

Lorek 2002; Jungbluth, Emmenegger and Frischknecht 2004; Kaenzig and Jolliet 2005; Tukker et al. 2006). Up to now, the prioritising of advices is mostly based on life-cycle assessment and environmental accounting. The consumption areas of housing, mobility and food are identified to be the prior areas in which improvements are needed (Tukker and Jansen 2006). On this basis the aspects of sustainable consumption can be derived that really matter. We refer to them as the "*big points"* of sustainable consumption and distinguish them from so called "peanuts". Peanuts represent all those activities with only marginal relevance for a consumers or households sustainability performance, however enthusiastic and prominent they are praised in sustainability communication so far. "Big points" are consumption alternatives which allow for particularly high reductions in resource use (e.g. insulation, investments into renewable energy). As concerns these "big points" of sustainable consumption, there is substantial consensus in the academic world. Especially for individuals sustainable consumption can be realised by adopting only few of those "big points".

For the area of sustainability communications – being generally ill-equipped with financial and human resources – this opens a number of strategic opportunities. Instead of giving 100s of advices for sustainable consumption behaviour equal attention and keeping all sorts of sustainability issues alive with rather negligible success, concentrating on a few "big points" of sustainable consumption can help to increase appreciation and probability of success enormously.

However, the formulation of priority-based lists does not automatically make statements on the likeliness of their implementation. Regarding their objectives, such lists define sensible but not necessarily accepted goals. Changes of the "big points" need to be *wanted*, too. If sustainability communication sets on the wrong issues in this case, the strategy of setting priorities can backfire on its original objectives. Rather than portraying innovative activities for sustainable consumption, spectres will be created which attach negative instead of positive associations to sustainable consumption patterns (e.g. the demand to only fly with airplanes on holiday every five years). Therefore, it should be the aim of sustainability communication to, for example, market those "big points" of sustainable consumption pro-actively which can be expected to generate high resonance and diffusion within society. At the same time, issues which cause resistance among a large number of consumers should be faded from the spotlight and have to be tackled instead with other instruments than information and communication.

Therefore the identification of "big points" is an important step in the assessment of advices for sustainable consumption. However, further steps of analysis need to follow. Generally speaking, there is the need to identify those "big points" where needs, opportunities and ability already exist to a high degree to take them up in consumer decisions and daily routines.[1] We call those advices to which this definition applies the "*key points"* of sustainable consumption. They encompass the opportunity to diffuse broadly into space and time and have the greatest possible potential to change

[1] For a distinction of the NOA concept in the area of sustainable consumption see Gatersleben and Vlek (1994).

unsustainable structures[2]. It needs to be taken into account that consumption decisions themselves have the potential for structural change. Investment decisions – for example – change the formal basic conditions of individual consumption. Also, consumption decisions impact upon other consumers as well as companies and thus influence either the reproduction of existing structures or set incentives for new ones. Both of these structural impacts ought to be optimised through a focus on appropriate consumption decisions.

Some first approaches which exceed simple prioritising in the sense of "big points" can be found in the expert verdicts of Nill et al. (2002), Spangenberg and Lorek (2003) and Kaenzig and Joillet (2005). However, these authors confine themselves primarily to the question of whether and when "big points" provide a financial benefit for consumers under the given circumstances. In addition to this, there is a lack of applicable strategies which allow for a definition of "key points" within varying contexts (e.g. on a local, regional or national level). This is however of great importance because "key points" – in contrast to "big points" – very much depend on the individual preconditions of the actors concerned as well as their particular basic conditions. In that context, the question is not *whether* consumers are relevant actors but which relevant contributions consumers can make and are supposed to make. The following section will provide an assessment strategy that helps to answer this question.[3]

3 From "big points" to "key points"

The selection of concrete advices for sustainable consumption, which are supposed to form the content of sustainability communication and which ought to function as catalysts for a change of elementary consumption patterns, requires complex reasoning. This is why we developed a strategic framework which allows for the selection of appropriate content for sustainability communication and at the same time exceeds previous approaches to prioritising advices. In order to do so, we established four perspectives of success as well as three assessment dimensions which merge into nine assessment principles. In addition, we identified an initial set of "key points" through an exploratory study on the basis of our strategic framework.

3.1 Perspectives of success

In a first step, we established four perspectives of success (Figure 1). They point to the key requirements which the strategic framework has to fulfil. At the same time, they represent the conceptual basis of the strategic framework.

[2] According to Giddens, structure comprises both formal structures (e.g. contracts, technological or socio-economic systems) as well as informal aspects (interpretive schemes, informal norms, authoritative resources) (Giddens 1984). Consequently, the structural embedding of sustainable consumption in daily routines can be realised through both the change of formal structures (e.g. tax on energy usage) as well as the change of informal structures (e.g. change in the perception of needs).

[3] For more detail see Bilharz 2008.

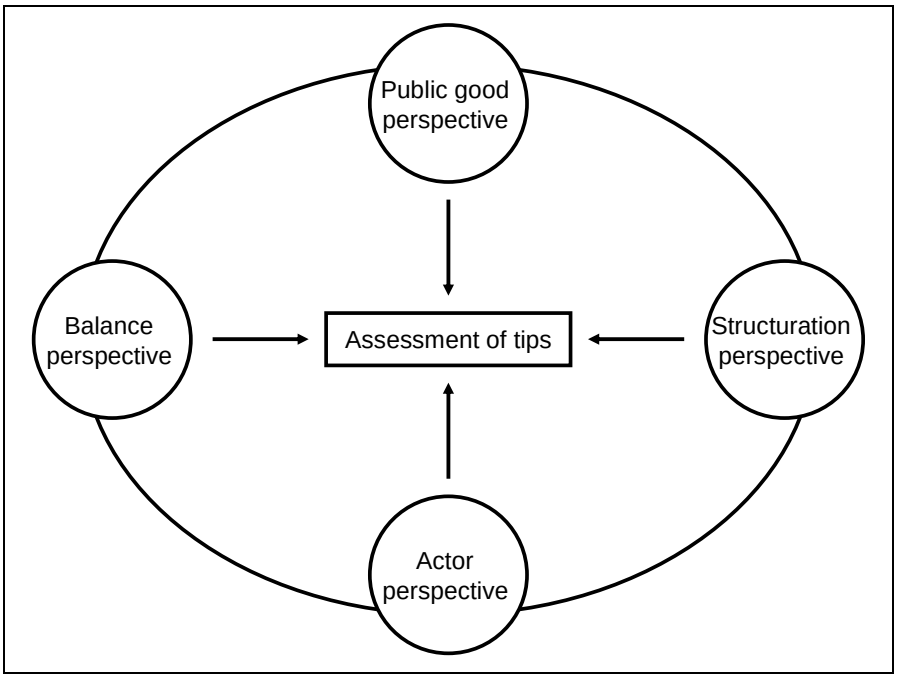

Figure 1: Four perspectives of success to foster sustainable consumption

- *Balance perspective:* The implementation of individual advices of sustainable consumption does not guarantee a sustainable level of consumption (i.e. that can be globally unified). Success therefore does not manifest itself in individual examples but rather can only be measured with a view to the overall impact of the actions. The precondition for doing this is the comparability of different actions amongst themselves. The basis of our understanding, therefore, is a resource-based view of sustainable consumption. In this way, the comparability of the use of the environment and natural resources is the minimum condition in order to determine sustainable consumption (Bilharz 2008, pp. 64-77).
- *Public good perspective:* Sustainability challenges are a collective problem. Therefore sustainable consumption starts with individually suitable activities. But the success of sustainable consumption, or rather measures to foster sustainable consumption can only be judged according to its contribution to collective changes.
- *Structuration perspective:* Collective changes will only occur if the structure of socio-ecological dilemmas is appropriately adapted (Heiskanen and Pantzar 1997, pp. 425-429). Success is said to follow from structural changes. Therefore, sustainable consumption is not about activating the "right behaviour within false structures" but it is about activating the "right behaviour to change false structures". The theory of structuration (Giddens 1984) points to the fact that consumption decisions can be viewed from a structural policy perspective.
- *Actor perspective:* In order for an advice to have an impact, it needs to be implemented. This requires attention being paid to individual preconditions and restrictions on an individual's actions. Only if actors want to consume sustainably sustainable consumption will occur.

In summary, the assessment of advices for sustainable consumption is twofold: it is political (public good perspective and structuration perspective) and it is strategic (balance perspective and actor perspective). The political side of it stems from its normative demand which explicitly aims at changing the behaviour of others as well as changing relevant structures. This statement is in no way trivial. Particularly the common parlance of (sustainable) *consumption* has a tendency to blur this demand (Bilharz 2008, pp. 288-296). The assessment is strategic in nature because it consistently argues in terms of the stated goal (balance perspective) and puts existing measures in relation to this aim (actor perspective).

3.2 Assessment strategy for "key points"

In order to identify potential "key points", we developed an assessment strategy in a second step. The strategy comprises three dimensions of assessment: "Environmental relevance", "individual durability", and "sociatal impacts" (Figure 2), from which nine rules of assessment can be deduced (Table 1).

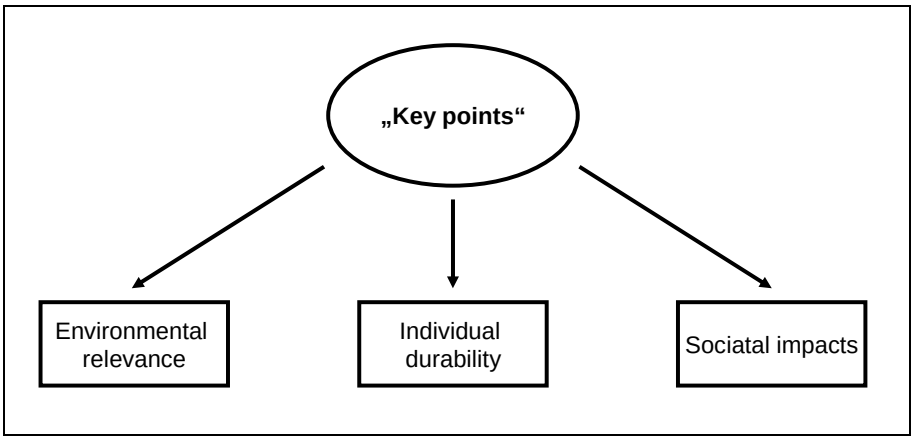

Figure 2: Dimensions of assessment of "key points"

"Key points" are characterised by their high relevance. In that sense, they can similarly be described as "big points" of sustainable consumption. The relevance stems from a high reduction potential on the one hand (e.g. in terms of energy) and from a small interpretative scope on the other hand. Only the advice which still has a great reduction potential following a careful interpretation can prevent "big points" from being reduced to "peanuts" once they are implemented in practice. Additionally, a "key point" is not a passing craze, but is rather characterised by a high probability of being implemented in the long term. This may be ensured by a greater net benefit of an act of sustainable consumption as compared to other consumption alternatives or it may be fostered by impeding a reversion to previous consumption patterns. The latter is characteristic for those advices which focus on investment decisions. Finally, "key points" genuinely affect other people and also transform collective structures. Differing aspects need to be considered in this case. In order for advices to affect others, they need to be visible in their implementation. Rather than opposing existing (global) trends, "key points" run ahead of future trends. This is made easier by the potential

of “key points” to realise economies of scale. The implementation of “key points” helps to transform relevant structures which have so far hindered (more) sustainable consumption. By supporting structural partners this impact is strengthened.

Table 1: Dimensions, criteria and rules of assessment

Dimensions	Criteria	Rules
Environmental Relevance	Reduction potential	The greater the reduction potential, the better!
	Interpretative scope	The smaller the interpretive scope, the better!
Individual durability	Net benefit	The greater the individual net benefit, the better!
	Individual context	The more irreversible individual changes in structure are, the better!
Sociatal impacts	Visibility	The greater the visibility, the better!
	Trend potential	The greater the potential to become a trend, the better!
	Scale effects	The greater the perceived scale effects, the better!
	Structural effects	The more relevant the collective structure affected, the better!
	Structural partners	The greater the activation of structural partners, the better!

3.3 Empirical specification

In order to identify “key points” of sustainable consumption according to the strategic framework described above, it is necessary to consider aspects of long-term embedding as well as the external impacts alongside the issue of the advice’s relevance. While “big points” may be identified with the methods of environmental accounting and life-cycle assessment, thus having an equal validity for all human beings, the long-term embedding in daily routines as well as the impact something achieves on others are highly dependent on subjective factors (e.g. personal preferences and values, possibilities to realise change, social context). For a first determination of “key points” we thus conducted an exploratory survey among environmentally aware consumers. With semi-structured interviews we analysed the subjective assessment criteria for “key points” among a selected group of ‘Friends of the Earth’ members in more depth (Bilharz 2008, pp. 225-317). During the interviews, we enquired different aspects and experiences of the interviewees with regard to implementing “big points” of sustainable consumption. This helped us to identify first insights on how well-suited certain “big points” are for sustainability communication.

On one hand, those topics most hotly disputed were identified in order for them to be covered by sustainability communication – all of these “hot potatoes” covered the aspect of sufficiency. Proposals that suggest consumers to, for example, give up their own car, live in reduced living space or to refrain from airline travel found little approval even among aware consumers. These “sufficiency” advices do not only pose problems for the interviewees regarding implementation. Also communication to others can cause great difficulty. This could be observed independent from the fact that these advices not only reduce resource use to a great extent but also lead to considerable financial savings for the individual consumers. On the basis of

our interviews, we found that a change of unsustainable consumption patterns initiated by consumers themselves cannot be expected in this area. Rather, it seems to be much more necessary to reduce the resource use of unsustainable consumption patterns via influencing structures. It is not the consumer but the citizen and those political institutions legitimised by him or her which hold primary responsibility for changes of the consumption patterns described above.

However, the interviews also helped to identify those advices for sustainable consumption where consumers are willing to listen and act. As "key points" of sustainable consumption we could derive: insulation (particularly concerning old buildings and lodging), investments in renewable energies, energy-efficient cars (3-litre car) and – with some limitations – car-sharing and the purchasing of organic food. Current framework conditions allow sensitised consumers to attain personal benefits from such sustainable consumption decisions already today. These benefits are furthermore acknowledged by colleagues, friends and neighbours. The issues mentioned find resonance, stimulate communication within personal circles and thereby enable further diffusion as concerns discussions on sustainable consumption as well as the development of related products.

The "key points" identified are primarily linked to technological innovations (insulation, renewable energies, and energy-efficient cars) or aspects of healthy living (organic food). In addition, it seems that they involve product features which are of no particular importance in the distinction of specific lifestyles. As opposed to a whole food or vegetarian diet, consumption alternatives such as the sourcing of green electricity, the insulation of houses or consuming organic food can be seen as being diagonal to existing lifestyles. This stems from the fact that an ecological adaptation of products does not infringe the products' basic usefulness nor does it circumscribe the manifold characteristics of specific lifestyles (e.g. convenience products).

Even though some of these measures are not even implemented by sensitised consumers, the interviews showed that the measures do show a potential trend for the future. Any communication activities in these areas will fall on fertile ground – thus "setting the ball rolling" with relatively little effort.

4 Nine principles for successful sustainability communication

As we have described so far, making "any sort" of advices a good sustainability communication is not sufficient for the long-term embedding of sustainable consumption. It is much more a case of – and this is the key message – foregrounding such action advices for sustainable consumption that really make a difference to conventional, non-sustainable consumption. To this end, a strategic focus and the setting of priorities are indispensable. Possibilities for acting in the interests of sustainable consumption have to be differentiated according to their importance and the available means of sustainability communication have to be applied correspondingly. It is thus not "just" a case of creating good campaigns in themselves, but rather creating good campaigns for relevant matters. In the process, all assumptions and conclusions outlined here in the "key points" do not have to be followed in detail as a matter of course. At the same time, one cannot forego deter-

mining focal points or changing the emphasis of focal points. We have summarised them in the form of nine principles.

4.1 The most important thing first! (instead of "It's all important!")

In supporting sustainable consumption it is not enough to hope for the "effect of many small steps". Rather, it needs to be much more a case of learning to differentiate between effective steps and less effective steps and to embed these in support measures as the focal points (Thøgersen 2005). A starving child who receives no education needs both food and education. But to be able to survive, it first of all needs something to eat. In the practice of sustainability communication to date, setting priorities in this sort of way cannot really be observed. Instead the idea of "It's all important!" continues to spread itself actively and successfully in many cases in contrast to the idea of "The most important thing first!", thereby preventing a strategically sound selection of action options for sustainable consumption. This is not only due (in our conjecture) to a multiple lack of expertise in organising consumption advices hierarchically – as also shown in our interview-based study with sensitised consumers (Bilharz 2008, pp. 225-317) –, but is also the result of an emotional connection to the hope that little things can have big effects. Therefore the realisation of the idea of "The most important thing first!" requires the rejection of two misunderstandings:

1. The idea of "The most important thing first!" is not an argument for "talking down" the contribution of consumers. On the one hand, individual efforts in the course of everyday activities always remain "small" from a global perspective; on the other hand it cannot be denied that the problems associated with global consumption can only be reduced when the everyday consumption patterns of those people in industrialised countries fundamentally change. It is not therefore a question of a basic criticism of the "small steps", but is rather a question of a differentiated perspective of "large small" and "small small" steps towards sustainable consumption. Exactly this can create motivation against the background of global challenges if it is seen that "big things" can really be achieved in miniature – and this also to one's own benefit.
2. The "peanuts" of sustainable consumption will not fundamentally change our consumption style. That is a fact. However this does not make "peanuts" automatically superfluous or even bad. One will continue to turn out the light when leaving a room and turn off the computer when it is not needed. Realisation of or the demand for "peanuts" becomes problematic when it takes up the available means (money, time, attention) to the extent that these means are lacking for the realisation or advertisement of the "big points" or "key points". Thus we are not proposing that "peanuts" be completely removed from awareness, but rather that by means of a greatly changed set of priorities the deployed means can be applied according to the importance of individual measures. It is clear that, for example, attention always has to be paid (but not only) to different target groups. For instance, initiating events with children and young people on the topic of car-sharing does not promise much success. To be sure there are many important and less important starting points for supporting sustainable mobility in the case of children and young people.

Above all, however, it is the case that "peanuts" are already being communicated by many other actors "on the side" independently of the efforts of the key sustainability actors (e.g. in daily newspapers).

The shift from "It's all important!" to "The most important thing first!" can be further concretised in three ways: by a resource-orientated approach, by focusing on priority advices and by the privileging of investment advices, as detailed in the following.

4.2 Thinking in terms of resources (instead of a disorientated "mixture of everything")

There is another important reason why the idea of "The most important thing first!" leads to realisation difficulties in the practice of sustainability communication. In the transition from ecological to sustainable consumption, the term became more diffuse, the number of criteria to be taken into account increased and the amount of possible advices multiplied as a result. However, the more aspects and dimensions that have to be taken into account in an assessment, the more difficult becomes the setting of priorities because one doesn't only have to compare "apples with pears", but has to now suddenly compare "apples with potatoes and milk", too. It is not very helpful, therefore, to lump together all that is desirable in the term of sustainable consumption and thereby make setting priorities impossible in the practice of sustainability communication. As a consumer one cannot take all "one and global problems" into account.

A more elegant solution to this dilemma is a more resource-orientated access to sustainable consumption (Bilharz 2008, pp. 64-77). To this end the central goal of sustainable consumption is to reduce the consumption of natural resources and decrease damage from using the environment as a sink.[4] This sharpening of the concept of sustainable consumption does justice to both the global dimension of the sustainability concept and the requirement of taking all three sustainability rationale (the ecological, economic and social) into account in an integrative manner (ibid.). Without a doubt sustainable consumption can also involve other aspects or "doing good" in other areas. But these aspects are of secondary importance as long as consumption advices do not also fulfil the criteria of fairness in terms of resources, i.e. being consistent with a distribution of resources that is globally fair.

The resource-orientated approach makes the transition easier from ecological to sustainable consumption, given that the integration of the social dimension in previous environmental communication has not been convincingly successful up to now and seems to be "artificial" in many cases. This can be explained by many of the social issues relevant to a global perspective are largely already being politically handled in industrialised countries. In contrast, the integration of the social dimension does not represent a problem in the case of a resource-orientated approach. This is because the intersection of social and ecological advices is already very great in this regard (ibid.). On the one hand the resource-orientated approach has the advantage for sustainability communication of enabling clear priorities to be set. On the other hand it prevents sustainability communication having to try

[4] For a details conceptualisation how resource use (energy, material, land) is related to main environmental problems see Spangenberg and Lorek 2002.

in vain to search for the social in the ecological advices that were formerly made central themes. Focusing on the consumption of resources also makes the assessment of consumption advices easier for consumers.

4.3 Priority advices (instead of priority consumption areas)

The usefulness of the resource-orientated approach is shown in the discussion about priority consumption areas. If the reasons for banishing priority consumption areas are considered, it becomes clear that they primarily follow the resource-orientated approach just outlined. At the same time, it needs to be emphasised that the clustering of traditional environment consultancy (waste, electricity and water consultancy) only have minimal overlap with priority consumption areas. There is after all extensive agreement that building/living, mobility and food are to be regarded as priority demand areas for sustainable consumption (Tukker and Jansen 2006, p. 167).

The determination of priority consumption areas can, however, only constitute the first step on the way to determination of priority action. This is because there are also “peanuts” in priority demand areas. The relevance of this theoretical consideration has been empirically underlined in an analysis of “consumer advice” handbooks for sustainable consumption by Bilharz (2008, pp. 195-224).For example, the consumption area of housing subsume a huge variety of all different marginal aspects from switching to energy saving light bulbs and avoidance of stand-by mode via using clothes washers as sparingly as possible to buying highly efficient appliances while the “big points” are thermal isolation, efficient heating (or cooling) systems and adequate room temperature. In general approx. 60% of the advices in the handbooks analysed are attributable to the priority demand areas but only around 6% of the advices target towards “big points”. Most of the advices even in the priority consumption areas have a “peanuts” character. In spite of increased focus on the priority consumption areas in the handbooks, an orientation towards priority advices is not observable. It would be fatal if sustainability communication remains at the halfway stage in setting priorities. Instead of prioritising the relevant consumption areas only, it has to consistently focus on priority advices.

4.4 Fostering investments (instead of foundering due to routine)

In the analysis of the “consumer advice” handbooks it became apparent that “big points” largely, but not exclusively, involve investment behaviour – in contrast to the entirety of the advices for sustainable consumption (Bilharz 2008, pp. 214-216). Focusing on “big points” or “key points” almost automatically has the prioritisation of investment advices as a consequence. This “inevitability” is in accord with theoretical considerations towards the long-term embedment of sustainable consumption (ibid., pp. 181-183; Gardner and Stern 1996, pp. 256-266). By means of the change in individual basic conditions, investments make the realisation of sustainable consumption possible virtually “by themselves”. For each single action it no longer has to be weighed up whether it is sustainable or not, or whether one selects the sustainable or the non-sustainable consumption option. The return to non-sustainable consumption patterns requires additional expenditure. Investment advices can generally be interpreted in fewer ways than routine-based

advices. The more (less important) ways in which a advice can be executed, the greater could be the danger that abstract demands come to nothing since they can be "fulfilled" by simple and/or symbolic actions. Ultimately the change in objective basic conditions enables a more objective control of success and a visible action. Instead of the simple one-off realisation of routine-based advices, sustainability communication should thus place greater emphasis on the agreeable long-term realisation of sustainable consumption by investments.

4.5 Targeting the critical mass (instead of "fizzling out" in the masses)

When does an advice become a sure-fire success? When does sustainability communication become superfluous? Against the background of the low provision of means for sustainability communication which are mostly only guaranteed in the short term, these questions are especially significant. Generally the answer is: an advice becomes a sure-fire success when it reaches a critical mass (Oliver, Marwell and Teixeira 1985). In terms of structural policy this is the case when the structures have changed so that the additional impulse for the maintenance of behaviour arising from sustainability communication becomes superfluous. This is already an important insight. In the implementation of measures of sustainability communication, it is not a question of reaching the majority of consumers in general, but rather reaching a *critical* mass. Against this background the argument that one can reach more people with simple advices needs to be re-considered. If only the realisable saving potential is considered, it is immaterial whether one tries to reach 1,000 consumers via a "50 kWh" advice[5] or only five consumers via a "10,000 kWh" advice[6]. The saving potential amounts in both cases to 50,000 kWh even if in the second case only 0.5% of the consumers were required compared to the first option (Figure 3).

However "advices for all" have several disadvantages. Such advices are already being put into practice by a large number of people. This leads to high scattering losses. Self-evident truths are being communicated to many people. The consumers who do not yet realise simple advices are distinguished by low involvement. This means that they cannot or can hardly be reached by means of sustainability arguments (Niva and Timonen 2001, p. 337). A lifestyle-based campaign is only partly a way-out. On one hand addressing a broad spectrum of consumers, who have varied types of lifestyles, makes different communication strategies necessary. On the other hand there are empirical findings suggesting that target group optimised campaigns often reach the "already converted" which are so to see again the "wrong ones" (Schötz et al. 2003, p. 18). A further problem appears with promoting "peanuts". Even in the perception of interested consumers sustainably consumption behaviour is often linked to "peanuts" shifts. This was confirmed in the interviews. Free association of activities for sustainability brought up the less important aspects first. Only after introducing some "big points" sustainable consumption was increasingly associated with other "big points", too. Through increased focus on "big points" in the place

[5] For example turning off the stand-by facility on the television and DVD player all year round.

[6] For instance heat insulation of a detached family house.

of small measures, it is possible that people would increasingly connect “big points” with sustainable consumption.

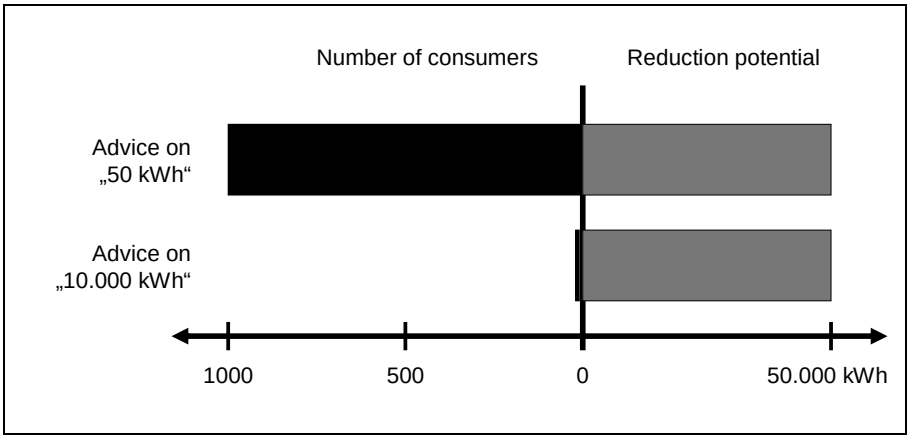

Figure 3: Necessary number of consumers for the same saving potential

The idea of the critical mass can also be further concretised. This shall be undertaken in the following using four further aspects: practising structural policy, the incorporation of further actors, the use of windows of opportunity and positive examples of action.

4.6 Practising structural policy (instead of preaching about a change in values)

The challenges of sustainable consumption in terms of generalisable consumption patterns are tremendous (Gardner, Assadourian and Sarin 2004). It is not simply a case of small corrections, but rather substantial changes in consumption patterns. Against this background appealing for critical reflection of consumer needs and demands according to a fundamental change in values is understandable, as it currently characterises the debate about sustainable consumption in the area of consumer policy (e.g. Tukker et al. 2006). However, independently of how desirable such a change in values would be, demanding it remains a measure without impact due to its abstractness (Heiskanen and Pantzar 1997, p. 414). As our interview-based study was able to demonstrate, it is fundamental to sustainability communication that sensitised consumers also (re-)consider “normal” cost-benefit perceptions. Therefore an abstract value discussion or a consumer-policy information strategy comes up short as long as the basic conditions carry on punishing instead of rewarding sustainable consumption. A social change in values cannot simply be arranged, but is rather in continual interaction with realised action (Priddat 1998, p. 151). Action is influenced however by a multitude of structures and not only by (abstract) values (Jackson and Michaelis 2003; Michaelis and Lorek 2004). Values are a specific structural variant, but only one and probably in most cases one with little influence. Therefore sustainability communication should concentrate on concrete structural policy instead of postponing it to abstract value discussions (Thøgersen 2005). In the place of appealing for fewer journeys by aeroplane, for example, it would be more constructive to foreground the

central structures that continue to stimulate air transport. This involves two points:

Viewing consumption through the lens of structural policy:

Not every advice for sustainable consumption is also effective in terms of structural policy. For instance, other authors regard the transformation effect of "critical air transport consumption" as rather low (Brockhagen and Bals 2004, p. 27). It is thus useful to analyse the structural transformation potential of consumer decisions. On the one hand individual structures are involved – investment decisions, for example, change the formal basic conditions of individual consumption. On the other hand collective structures are affected too – consumer decisions also have an effect on other consumers or organisations such as companies, thereby influencing the reproduction of current structures. Both structural-political effects need to be optimised by focusing on suitable consumer decisions ("key points").

The consumer does not necessarily have to be conscious of these aspects of action. The actor must not and cannot look at all of the structural moments reproduced by his action. But sustainability communication must be conscious of the side effects of this action in the assessment of advices for sustainable consumption or has to make assumptions about this. Analogously the increase in political and strategic emphasis does not refer to this execution, but rather to the selection of advices. It is not always necessary for someone who has invested in renewable energies to also want to achieve an energy transformation towards renewables. However it is decisive for sustainability communication that his or her investment has an effect in this direction.

It seems important at this point to point out that the influence of "key points" on structures is not one-way. The successful diffusion of the "key points" of sustainable consumption likewise changes these or the conditions of their realisation. The success of organic products changes, for example, not only the conventional food trade, but also the specialist organic trade (Gerlach and Spiller 2006, p. 143). Thus a conventionalisation can be observed in the organic market, which is both cause and effect of the increased demand for organic foods (Brand 2006, p. 253). Putting it in more exaggerated terms, the specialised organic trade, the idealistic farmer and the idealistic owner of a wind power plant are becoming marginalised. When "real" money can be made with sustainable products and services, the profiteers also come along, who in turn have to be legislatively "restrained" (e.g. in the form of regulations for the minimum distances of wind power plants from residential buildings). This leads onto the next aspect.

Increasing the value of initiative-based action:

Consideration of the political effect of consumer decisions is not allowed to lead to neglecting political action itself. This is due to the fact that consumption that is effective in terms of structural policy can contribute to support of the changing of structures, but can surely not substitute for active input of formal structural changes. If we stay with the example of air transport, it can be said that the internalisation of the external costs of air transport requires an instrument such as kerosene taxation. This does not become

more probable as a result of avoiding air travel.[7] Not sustainable consumption, but rather initiative-based acting for legislative regulations would seem to be a more appropriate strategy in this context. Development of the significance and necessity of initiative-based acting as well as of the boundaries of sustainable consumption also has to be firmly embedded in the scope of sustainability communication aimed at supporting sustainable consumption – instead of being a fringe topic as is the case, for instance, in most "consumer advice" handbooks. This is because focusing on sustainable *consumption* tends to restrict the associative space of possible individual actions, as our interview-based study made clear. At the same time one runs the risk of the responsibility of the people as "active citizens" (voters, association members, opinion-makers or financial supporters of sustainability organisations) fading into the background (Wilhelmsson 1998; Uusitalo 2005; Reusswig et al. 2008).

4.7 Incorporation of further actors (instead of many actors who go it alone)

In terms of education, sustainability communication can hardly count upon support from sensitised consumers since they show little ambition to actively have an effect on the consumer decisions of others (Bilharz 2008, p. 295). Sustainability communication of individual actors therefore requires other supporters such as associations or companies who profit from sustainable consumption. However, it should be taken into consideration that the means for measures of non-commercial sustainability communication are extremely scarce in comparison to expenditure in commercial marketing. It is therefore constructive to foreground such action advices which could become successes on the basis of the companies' own interests (e.g. the heat insulation of houses instead of advice about heating behaviour, renewable energies instead of pleas for electricity saving). In this way the identified "key points" show similarly-inclined actors the direction – actors who can help lead the way out of the multi-faceted dilemmas of non-sustainable consumption.

In addition, topic-specific starting points for multi-actor programs in particular ensue for consumer policy on a state level. For example in the area of termal insulation energy-contracting for the energy conservation of public buildings is conceivable, as is a cooperation between the agency for the protection of historical monuments and the building and construction industry for the further development of energy-saving acts or a cooperation with tenant associations with regard to passing on the costs of measures for energy conservation onto monthly rent. In the context of investments in renewable energies, consumer protection organisations could work together with financial service providers in order to push development beyond the eco-niche criteria for the standardisation and quality assurance of financial products in this growing market. How the chances arising for small investors on the basis of feed-in tariffs for renewable energies (such as the Renewable Energy Sources Act in Germany; Wüstenhagen and Bilharz 2006) could be

[7] The opposite is rather likely to be the case. When demand falls, saving measures are threatened by the airline companies, i.e. also job cuts. Under these conditions the parallel introduction of a kerosene tax (which means air transport would become more expensive) is probably an even less enforceable policy.

guaranteed and extended in the continuation of such acts would need to be examined in cooperation with the finance ministry. In the case of the "3-litre car" the cooperation of (large) transport associations and the car industry would be tenable for stimulating a collective demand for fuel-saving models in terms of, for example, prototyping (Neuner 2000). Many further promising approaches for supporting the "key points" of sustainable consumption are conceivable. Which specific measures on the part of individual actors can and should be concretely taken in these areas would have to be determined in further detailed analyses. Moreover the concrete possibilities of individual measures (or sets of measures) would need to be further investigated with a view to possible actor alliances and current scopes for action. The parallel incorporation of different actors is decisive since it is precisely the irregularity of the measures of individual actors that leads to means being used highly inefficiently. As a result many measures do not reach the critical mass and do not therefore become successes.

4.8 Creating and using windows of opportunity (instead of hoping for better times)

Strategic consumer decisions (such as choice of residential location) largely determine individual resource consumption in the long term (Bodenstein, Spiller and Elbers 1997). The same applies on a social level for the path dependency of many technical developments. It is precisely in the context of a change in non-sustainable structures that the change of strategic consumer decisions and support of path-changing innovations acquire high significance (Nill and Zundel 2001). So-called "windows of opportunity" often determine how successful the realisation is (ibid., pp. 154-157).

Sustainability communication should therefore both identify and actively prepare for windows of opportunity (such as the BSE crisis or discussions about climate change) in order to be able to successfully position corresponding communication measures (e.g. with regard to the organic label or the planned eco-tax reform). A current window of opportunity for a path-changing innovation is the subject of renewable energies. Alongside the generally high approval of renewables (Allensbach 2003), the Renewable Energy Sources Act in Germany and similar acts in other countries such as France or Spain enable possibilities for investing in renewables that are attractive to consumers. They should therefore be a central topic of the current sustainability communication.

However windows of opportunity can also be influenced and created – in combination with the parallel incorporation of further actors. In this context, "pro-articulations" by organised consumer associations constitute interesting and practically unexplored multi-actor approaches (Neuner 2000). Whilst contra-articulations such as active, public boycotting or passive turn away from specific products or services send protest signals against service deteriorations on the part of the suppliers, pro-articulations are based on the principle of cooperation between supplier and the "demander" (i.e. customer). The goal is to initiate or positively rewarding particular supplier behaviour by sending positive signals. This can be directed at existing products and services which have a marginal market share (buying) or at prototypes that are not yet well-established (prototyping). If the consolidation of positive signals is achieved and the signal intensity thereby reaches

a critical mass, existing markets can be sustainably influenced and existing barriers to market entry can be removed. Sustainability innovations can be accelerated in this way or even made possible in the first place, as was the case, for example, with the introduction of the CFC-free refrigerator. In this way, these cooperation-based strategies provide extremely interesting possibilities for the “opening” of latent windows of opportunity.

4.9 Leading by good example (instead of advising others)

Beside private consumption also public consumption matters to a considerable extent. As a result, the demand behaviour of public purchasers often has far greater consequences for sustainability than the daily choices of most household consumers (Mastny 2004, p. 133; Thøgersen 2005). In the EU public procurements amounted to approx. 14% of the Gross Domestic Product in 2001 (Mastny 2004, p. 122). The strong rise of organic food consumption in Denmark can at least partly traced back to the cumulative demand from public procurement in canteens and hospitals.

It would not simply be a symbolic act if actors of sustainability communication such as consumer ministries were to present themselves as supporters of “key points” of sustainable consumption, not only towards the private end-users, but also the other ministries as well as public administration (Belz and Reisch 2007, pp. 293-297).

5 Outcome

The tremendous challenge to make consumer patterns more sustainable can only be successful if the limited (financial and attention) resources for its support are used more effectively. Focusing on “key points” of sustainable consumption is a very promising approach in this respect. By positioning them at the centre of measures of sustainability communication, consideration is given to the demand for a focus on concrete products and behaviours (instead of working from an abstract vision of sustainable development) At the same time it contains (urgently needed) political and strategic components based on the goal of sustainable consumption in terms of generalisable consumption patterns. Consumption becomes a policy instrument that can make a valuable contribution to achieving a normative notion of intra- and inter-generational fairness with regard to the use of natural resources and sinks.

Which specific measures on the part of individual actors can and should be concretely taken would have to be decided in further detailed analyses. Moreover the concrete possibilities of individual measures (or sets of measures) would need to be further investigated with a view to possible actor alliances and current scopes for action. Our empirical study was able to make an initial contribution to this by naming “key points” and showing a path in which progress can be more rapidly made:

- Start with the most important.
- Think in terms of resources.
- Prioritise advices.
- Foster investments.
- Target the critical mass.
- Practise structural policy.
- Incorporate further actors.
- Create and use windows of opportunity.
- Be the good example.

What is decisive is that those who support sustainable consumption in terms of generalisable consumption patterns can realise these in the long term and see that their consumption has a tangible effect: on the overall use of resources, on other actors and on the relevant structures. Summarizing the message for future sustainable consumption communication we can say: Move from “peanuts” via “big points” to “key points”! (Figure 4).

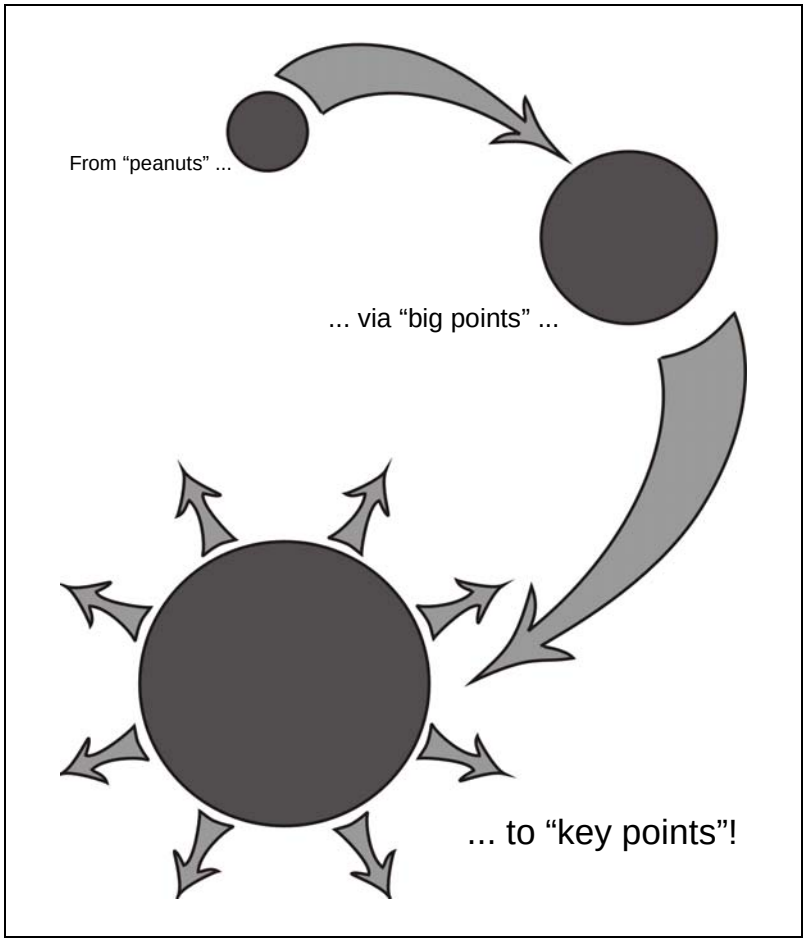

Figure 4: From “peanuts” via “big points” to “key points

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Built environment (2)

Chapter 18 User-producer interaction in housing energy innovations

Energy innovation as a communication challenge

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1 Introduction: why is there no progress in energy efficiency even though the technology is within reach?

According to the EC Green Paper on Energy Efficiency, the buildings sector accounts for 40% of Europe's energy requirements. It is argued that more than one-fifth of the present energy consumption could be saved by 2010 by applying more ambitious standards to new buildings and when refurbishing existing ones. Energy costs are also becoming increasingly significant for households as well, especially in cold climates, as the prices of electricity and oil are rising.

This is the situation in Finland, as well: "There are market-ready technologies in Finland that could cut the energy bills in buildings by 20% by 2015", said Senior Researcher Pekka Huovila at the publication event of a book called Energy Use by VTT Technical Research Centre of Finland last May (Pöysä 2007).

Energy conservation is possible and necessary, but why is so little actually happening? The other side of the coin is displayed in the citation below, in which a well-known columnist (Merikallio 2007) of a popular weekly magazine, Suomen Kuvalehti, complains about the situation in a column titled "Who will cure my oil addiction?":

> "Every time I hear a rumble from the boiler room, I get annoyed. I am burning some more oil again, and contributing some more to climate change. … The small everyday decisions are easy: you can leave the car at home, turn out the lights and recycle everything that you possibly can. But when it is time to overhaul your heating system in an old house, you step into the 'twilight zone'. The Internet abounds with geothermal heat pumps, pellets, district heat, air heat pumps, solar panels, oil-solar combinations. Every salesman says their

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme

> offer is fantastic, but no one tells you what the pitfalls are… Even making a bid for tenders is so complicated that you give up… And all the heating systems are either expensive or extremely expensive. When will they finally set up a proper advisory system? Couldn't an energy expert come to your home with all the meters and calculators and tell you what is the best heating system for you? I promise to offer them coffee and cake!"

If we believe the Finnish commentators cited above, the core of the problem is in a communication gap. It seems plausible to argue that the current markets do not transfer the necessary information about workable solutions, even though both construction companies and residents would be motivated to do something about energy efficiency.

We do not argue that it is simply a matter of communication breakdown. Energy prices have not always encouraged companies or consumers to actively search for the most energy efficient solutions. There has also not been sufficient political will to apply the full scale of regulative measures to adopt stricter building or urban planning codes. Nonetheless, we argue that the communication gap is also a reality, and it would exist even if prices and legislation were more forcefully steering the parties involved toward greater energy efficiency.

In the following, we outline the communication problem first on a general level. Then, we make an in-depth exploration of the communication gap by analysing the evolution and experiences of a Finnish programme to promote low energy housing. Finally, we suggest some solutions to address the communication challenges.

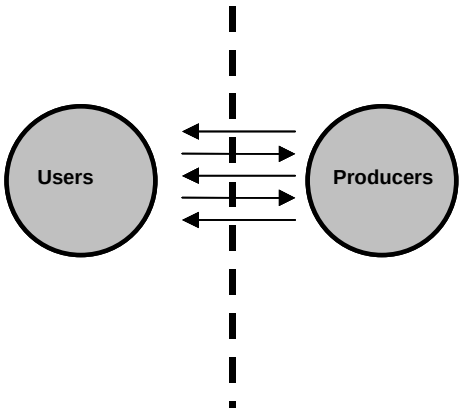
2 The problem of 'sticky information'

Energy means different things to different people. Studies have found that people do not know much about household energy use (Eurobarometer, 2006). While such findings suggest that more public education is necessary, they can also be criticized for exhibiting a 'deficit model' (Irwin and Wynne, 1996) of lay knowledge concerning energy. It is assumed that because lay people do not have the same kind of knowledge as experts do, they know nothing. Other authors consider the problem of energy knowledge from the opposite perspective (Shove, 1998; Guy and Shove, 1998). Experts simply frame energy use in different terms – often ones that are distant from ordinary households' concerns. They fail to understand why households behave 'irrationally' because they fail to grasp the logic of energy use (e.g., Parnell and Popovic-Larsen, 2005) .

The exchange of energy efficiency knowledge among experts and lay people reflects a fundamental problem in product innovation. Von Hippel (1998) has termed this a problem of "sticky information": information about users' needs and manufacturers' capabilities is highly contextual, tacit and difficult to transfer from one site to another (von Hippel, 2005). This problem slows down the product innovation process – many rounds of information exchange are needed in order to establish facts and clarify perspectives (Figure 1a).

The problem of "sticky information" is further complicated in the case of societal innovations such as energy efficiency (Kivisaari et al., 2004). Here, societal actors like public energy agencies have their own perspective on the innovation, which differs from those of the users and producers. The societal actor will thus need to try to communicate with both producers and users in order to promote its own knowledge and understand the requirements and competencies of the market actors (Figure 1b).

(a)



(b)

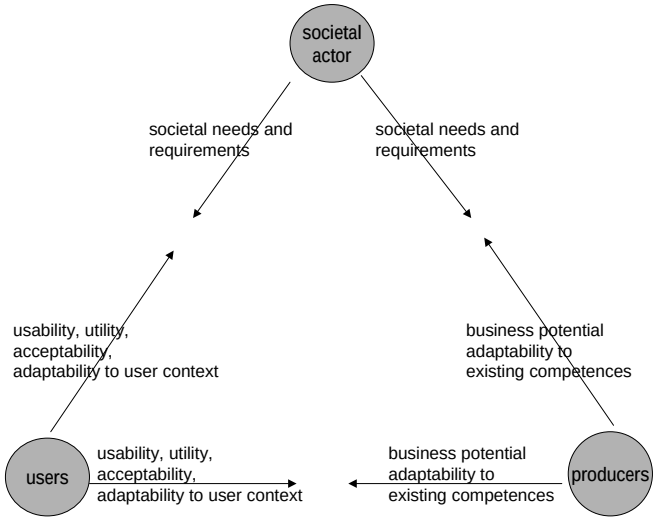


Figure 1: (a) Von Hippel's (1998) view of the problem of 'sticky information' in product innovation and (b) the particular problems in societal innovations (Kivisaari et al., 2004)

A frequently proposed solution to this problem is intensified interaction between the world of designers and the world of users. This can consist of *designer participation in the user context, user participation in design*, or *user innovation*.

Designer participation in the user context: Designers may go to visit the users at home or at their workplace, and use ethnographic observation to understand the users' world. A number of design tools have also been developed on the basis of ethnographic or field observations (e.g., Beyer and Holtzblatt 1998). We are not aware of direct applications of ethnography-based design tools in the field of sustainable innovation. But, for example, Chappels and Shove (2005) have made extensive use of field research to investigate and problematize the concept of "thermal comfort".

User participation: Participatory design in the workplace has a long tradition in Scandinavia, and has recently also evolved to encompass a broader range of users (e.g., Magnusson, 2003). User participation means that users join designers "at the drawing board", for example by participating in "user groups". This approach has been applied, for example, by Spaargaren et al. (2006) to identify how well a variety of sustainable innovations fit into their everyday life and social practices. Similarly, Hoffmann (2006) and colleagues have used user workshops to identify development needs in a sustainable product concept.

User innovation: Users' own inventions and innovations can be a direct source of commercial products. Von Hippel and colleagues have found that at least in some product groups, a large proportion of users invent and customize their own products (von Hippel, 2005; Jeppesen and Molin, 2003). Alternative energy is a technology in which user innovation has traditionally had a significant role (Jamison, 2001). As contemporary examples, Ornetzeder and Rohracher (2006) have analysed two Austrian cases of user innovation in solar collectors and woodchip boilers.

3 The Motivoittaja project – introducing a user-friendly low-energy housing concept

As a case study on the role of user knowledge in the introduction of energy innovations, we consider a recent Finnish project aimed at promoting 'low-energy housing'. In 1999, Motiva, a state-owned company responsible for promoting energy efficiency and renewable energy, launched a project aiming to mainstream and 'normalize' the concept of low-energy housing through a technology procurement competition and labelling system (called 'MotiVoittaja') targeted at the producers and consumers of prefabricated detached homes (more details are found in Halme et al., 2005; Heiskanen et al., 2007).

Low-energy housing as conceptualized in the project refers to a set of different technologies. The technologies include increased thermal insulation, low-energy windows, reduced air leakages, recovering heat from exhaust air, extracting energy with heat pumps, passive solar energy and building orientation. A key aspect is a systems view of designing a house. Design is based on a thorough understanding, control and utilization of the energy flows within a building.

The Motivoittaja project sought to promote the diffusion of the low-energy concept through a technology procurement competition. Technology procurement is an instrument for stimulating innovation through a targeted acquisition process. An influential buyer or group of buyers formulate the requirements, and market transformation is further influenced by support

activities. In the MotiVoittaja project, the award was designed to function as a label of endorsement, allowing prospective customers to identify 'certified low-energy houses'. Moreover, Motiva assembled an 'initial buyer group' of prospective homebuilders willing to make a commitment to purchase a 'MotiVoittaja' house.

The competition was launched and administered by Motiva Ltd. The other key partner was the Finnish national technical research institute, VTT, which had been intensively involved in developing low-energy housing technology with an emphasis on user benefits. Motiva and VTT also tried to take into account the consumers' expectations on the basis of previous experiences of problems in adopting low-energy housing. The construction process is stressful for consumers. Few consumers are interested in experimenting with new technologies in this situation – hence, a third-party 'label of endorsement' might increase consumers' confidence. The underlying belief was that homebuilders are increasingly consumers of ready-made products. The product should be easy to identify and purchase, and it should convey other than energy- and environment-related benefits, such as comfort and healthy living (Halme et al., 2005).

A jury of external experts was invited to determine the winners. The competition was published in 2000 and the winners were announced in 2001. The initial response was positive, with 20 entries into the competition. Eight of the entries were awarded with the MotiVoittaja label, and two were awarded retrospectively. The energy consumption of the awarded designs ranged from 60 to 130 kWh/m^2, but was at least 35% less than average. Motiva and the jury were quite happy with the cost level achieved: the construction costs were 1300-2000 euros per m^2 of living area.

Four of the 10 companies awarded the label actually offered their winning design for sale, and three were still offering a "MotiVoittaja" house in 2006. The housing manufacturers were somewhat disappointed with the sales performance: they had expected a more enthusiastic market response and more deals with the initial buyer group. The project largely failed to promote commercial models marketed specifically as low-energy housing and to establish a widely acknowledged set of criteria for this type of housing. Yet in general, one can conclude that the targets of raising awareness of low-energy housing and mainstreaming the concept were actually fairly successful.

4 User representation and participation in the project

Users were present at various stages of the project. The forms and intensity of user participation is described briefly in the following.

Planning, criteria-setting and selecting the winning entries were conducted by experts: the project managers, the expert evaluators and the jury involved in the competition. There were, however, two user representatives in the jury. In particular, the representative of National Association for Detached Housing Construction represented the homebuilder's perspective in the project. Moreover, the project managers and the jury made an effort to address some of the homebuilders' (perceived) concerns related to low-energy housing, namely costs, convenience and indoor air quality.

Formal communications: Most of the communication on the project followed a top-down model. Communications were directed at the trade and daily press and other media. The project received extensive media coverage and favourable press. However, the project managers themselves were of the opinion that more efforts should have been placed in communications after the competition.

Nonetheless, one important communication success was achieved through participation in the Finnish nation-wide Housing Fair events. These are annual events that create a new model housing development each year in a different location, and illustrate novel technologies through demonstration constructions. After the event, the houses are sold to 'normal' families, and the fairgrounds are turned into a residential area. Motivoittaja was presented as a concept in the 2001 event, and demonstration houses were built for the 2002 event.

Assembling the initial purchaser group: Gaining market commitment from initial purchasers is an important part of technology procurement projects. In this case, purchasers were private consumers, so assembling the group was difficult. Finally, a buyer group of 40 families was gathered. Yet the buyers turned out to be quite reluctant to make binding contracts with the manufacturers. Some were not satisfied with the standard awarded models, and requested so many modifications that the houses no longer met the energy efficiency criteria. The most important initial buyers were also purchasers of Housing Fair houses. Three awarded models were constructed for the Housing Fair and sold before the fair. The families who moved into these houses became the most important showcases for the MotiVoittaja concept.

Informal communications: In the formal communications, the media coverage was quite favourable. The 'unofficial' communication ongoing on Internet discussion forums revealed a more mixed reception. There were divergent opinions on what "low-energy housing" means, and much debate about real-life heating costs. One recurring topic was whether to invest in geothermal heat pumps or increased insulation. This discussion implies that the 'systemic design' idea was not adopted by ordinary homebuilders. There was also some competition between contrasting concepts of ecological housing: one based on traditional construction methods and natural materials, and the other 'modern' one involving well-sealed structures and highly controlled air and energy flows.

Market: By stimulating a market for 'mainstream' low-energy housing, the project attempted to align itself with the (perceived) interests of ordinary homebuilders, and especially the growing group of middle-class people who rely on ready-made market offerings. Yet homebuilders are variegated group. They typically consider a number of different heating and construction options and balance a range of requirements. Prefabricated houses are also not an ordinary industrial product. They are sold in small quantities, and even 'standard' models are often modified extensively. This is problematic when considering energy efficiency from a 'systemic design' perspective: modifications should not interfere with the planned and controlled energy flows.

A survey conducted half a year after the competition (Mikkola and Riihimäki, 2002) revealed that interest in energy conservation and ecological solutions is growing among homebuilders. Homebuilders felt, however, that

there is not much reliable information on the topic, and they were confused by the different concepts. Less than half believed that one can halve a building's energy demand with small additional construction investments.

5 Successful and unsuccessful aspects of the project

In terms of successes, the Motivoittaja project surmounted some communication challenges vis-à-vis users and producers (Figure 2). It managed to raise user awareness of energy conservation. It also managed to address some user issues, such as comfort, convenience, and indoor air quality. But the project seems to have been more successful in communicating with the producers. A large number of these companies became convinced of the future importance of energy conservation in housing, which is reflected in the number of entries in the competition.

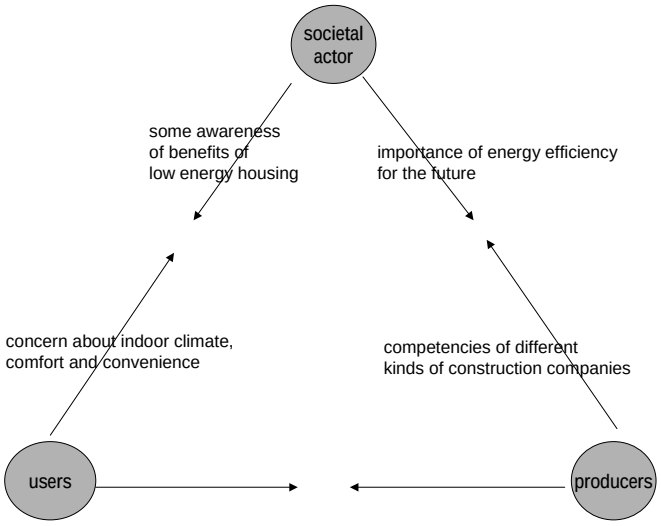


Figure 2: Successful aspects of the communication between societal actor, users and producers in the Motivoittaja project

Yet the Motivoittaja project failed to address a number of communication issues (Figure 3), in particular vis-à-vis users. It was not capable of convincing the users of the urgency of energy conservation. At the time of the competition, signs of this urgency were not commonly visible. After the competition, the price of energy has steadily risen. More stringent requirements on energy efficiency in buildings have been placed. These developments were on the horizon at the time of the competition, but the project was not able to communicate them convincingly. Moreover, the project failed to dispel the confusion surrounding low energy housing.

The project also failed to address some key features of the user context that would have been important for the project design. These include the diversity of the user base, the desire to participate and "be in the know", and their desire to 'tailor' solutions and to customize their house.

There is also a communication issue between the users and the producers, which neither the Motivoittaja project nor the producers have managed to resolve. This is the lack of trust of homebuilders in the information provided by prefabricated housing manufacturers.

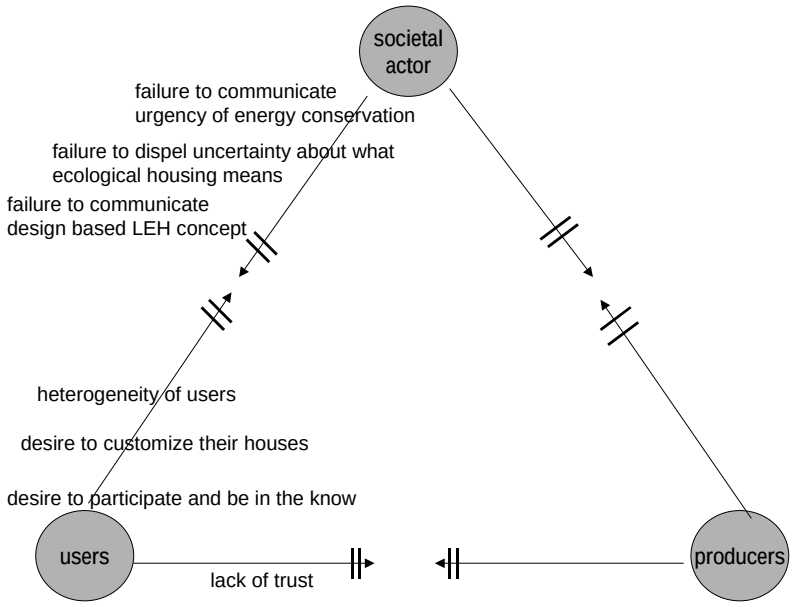


Figure 3: *Un*successful aspects of the communication between societal actor, users and producers in the Motivoittaja project

6 Approaches to intensifying knowledge exchange among users and experts

Next we consider whether more interaction between users, producers and societal actors might have helped to surmount some of the failures. We revisit the three categories of user involvement presented earlier, and consider the kind of contribution that they could have made to the project.

Designer participation in the user context refers to close ethnographic or interpretive research of the user context by the designers. In the Motivoittaja project, it seems that a better knowledge of the *user context* would mostly likely helped the project to address usability, utility, acceptance and user context issues to a greater extent. In fact, the designers of the project were, to some extent, aware of the diversity of the user base and the complexity of the homebuilding process. More systematic field observations might have reinforced the role of this knowledge in the design of the project. This is a problem that Akrich (1996) has identified: even when there is useful experiential knowledge or market research available, designers' user representations tend to converge around pre-defined project targets.

User participation in design refers to the direct involvement of users in the design of the development and promotion of the innovation. In the Motivoittaja project, such approaches (e.g., user groups, focus groups) might

have revealed, in particular, the reservations that users have vis-à-vis their role. Issues that might have come to the surface include the lack of trust in prefabricated housing manufacturers' claims and the users' desire to customize their homes. Moreover, a closer understanding of how homebuilders understand energy use and the concept of ecological housing could have helped the project managers to find ways to communicate the urgency of energy conservation.

User innovation implies a deeper and more fundamental participation by users. Here, users actually come up with solutions that are later integrated into commercial-scale designs. User innovations are not uncommon in low energy housing; in fact, many early models were built by individual users for themselves (see also Lovell, 2007). Such concepts are quite variegated, ranging from high-tech solutions with a high input by contractors to quite low-tech self-construction solutions. They are usually closely tailored to individual users needs (Daniels, 2007).

The notion of user innovation is partly contradictory to the vision of the Motivoittaja project, which aimed to go beyond individual custom-tailored solutions and to move low-energy housing into the mainstream market. We agree that it is not obvious that even the best users' self-designs are readily transferable to the mainstream market. However, homebuilders accumulate a lot of useful experience during their homebuilding project, and the Internet discussion sites show that they are willing to share their knowledge and ideas with others. The Internet might also offer a solution for systematic pooling of user knowledge. For example Halme et al. (2005) suggested that the Motivoittaja project might have considered an "open design platform" rather than encouraging each manufacturer to come up with its own competition entry.

We also argue that engaging *user innovation*, along with more *user context knowledge* and *user participation* would most likely have also helped the project to communicate the rationale underlying low energy housing. There are two reasons for this: a closer contact with users helps to understand their communication needs, but can also help to access peer-to-peer communication networks, which are highly effective communication channels. Projects aiming to promote energy efficiency (or other societal goals) can benefit from the use of such existing networks by finding grass-roots promoters and "multipliers" (e.g., Brohmann et al., 2006).

Our case also highlighted the issue of *trust*. The users' lack of trust in the producers' communications was one of the problems not fully solved in the Motivoittaja case. Perhaps users would be more willing to engage in experimentation with low-energy housing if they could be directly served by a neutral, impartial third party (i.e., an intermediary organization). Motiva is an intermediary organization, but one operating on the national level and providing general information. Local intermediaries providing tailored advice and contracting solutions might serve the homebuilders' interests.

7 Conclusions

Motivoittaja is an example of a project that was quite ambitious and user-friendly when compared to many other energy-efficiency projects (see e.g., Vreuls 2006). Yet we have seen that even this state-of-the art project could most likely have been improved had users been involved more intensively,

and had the project also made use of user participation in communication about the project. However, the case also shows that existing methods for user involvement require tailoring to different contexts.

1. Our case illustrates the fact that users', producers' and societal actors' knowledge is differently distributed in different industries. Methods for user participation need to be adapted to the needs of specific user-producer (and societal actor) constellations. The example of homebuilding is a special case: users have a strong involvement in their homebuilding projects, and they have a lot of ideas about their needs and expectations toward their new homes. Nonetheless, most users are first-time users, with little knowledge of the homebuilding process.

2. Knowledge and experience is differentially distributed also within the user community (von Hippel, 2005). Homebuilders acquire a lot of information after having gone through the homebuilding process. Experienced users are thus much more knowledgeable than novice users. Even today, users share much of their accumulated knowledge with each other, and promoting such peer-to-peer knowledge sharing may be one of the elements in successfully promoting low-energy housing. Thus, the notion of user-inclusive innovation communities (von Hippel, 2005; Heiskanen et al., forthcoming) could provide some useful insights for energy efficient housing design. As practical projects are implemented, they provide experiences that are useful for others, and thus promote learning. For example, Motiva today organises such information exchange via a website called Energy Efficient Home, which monitors the progress and experiences of a number of individual construction projects.

3. The type of knowledge needed for different types of products varies. Detached houses are products in which local knowledge plays an important role. Unlike many other industrial products, users do have a relatively large role in specifying the product, and thus those promoting low-energy housing cannot merely focus their efforts on producers. Prefabricated houses are not conventional mass-produced products, but rather mass-customized products according to users' needs and the local construction context (e.g., energy sources available). Design solutions need to consider these characteristics, and therefore there is a need to find solutions that can accommodate a lot of customization without compromising energy efficiency features. There is a need for active collaboration among demanding and motivated customers and innovative construction companies in order to find a sufficiently broad range of good solutions. Public sector organizations and knowledge brokers can facilitate the diffusion of these solutions so that a larger number of residents and constructors can get started.

4. Knowledge is not neutral. The user involvement literature has not paid much attention to issues of *power, interests and trust* (Hyysalo & Lehenkari, 2002; Ivory, 2004); it is often implicitly assumed that information asymmetries and conflicts of interest are solved by improved communications. The fact that different parties may not want reveal all the information they have, or may not be willing take the information received at face value, is usually not explicitly addressed. Thus, more attention should be devoted to finding ways of organizing user-producer-societal actor interactions that serve to align the long-term interests of different parties. Here, different kinds of intermediaries and knowledge brokers can have a crucial role.

5. Different types of knowledge are not easy to integrate, even though integration is crucial for innovation. For example, Collins and Evans (2002; 2004) have started to categorize the different types of expertise involved in the societal application of scientific knowledge. This is important for understanding how different parties can contribute to the development of new knowledge and new solutions. They have identified the important role of "*interactional expertise*", which is a form of expertise that relates to translating knowledge between technical and everyday forms of understanding. It is not yet very well known how interactional expertise evolves, but it seems that people who are simultaneously users and producers of new knowledge has been found to be very important for the development of innovations that combine scientific knowledge with users' requirements (Carolan 2006).

6. Regulatory instruments are information, too. Stricter building codes do not only create a market for energy efficiency, they also solve some of the communication problems. Building codes and recommended solutions can reduce uncertainty for both companies and residents when comparing the different solutions. For example, if urban planners simply required the use of geothermal heat pumps in an area that is well-suited for them, it would be useful information rather than unnecessary meddling with the market. In Finland, the Ministry of Environment has started implementing the Energy Performance of Buildings Directive by revising energy standards with the target of improving the energy efficiency of new buildings by 30-40 per cent as of 2010. It would be good to take into account the communication aspect when drawing up the new energy standards.

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Chapter 19 Enabling solutions for creative cities

Improving city life in Milan neighbourhoods through Academic Projects

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1 Abstract

This paper presents a specific approach to service design based on social innovations in urban contexts as a way to promote sustainable development. Within these social innovations the focus is on creative communities, which are *"groups of innovative citizens organising themselves to solve a problem or to open new possibilities, and doing so as a positive step in the social learning process towards social and environmental sustainability"* (EMUDE, 2006; Meroni, 2007).

Analyzing the services developed by these communities it was considered the possibility of designing solutions to facilitate the implementation of similar services.

To validate this approach, students in the Design Concept Lab developed localized solutions in a suburban neighbourhood in Milan.

Both the strategy and instruments of the solutions proposed, and presented in this paper, were designed to facilitate and accelerate a process of participatory design. They include shared places and services; productive activities based on local resources and skills; a new generation of urban farmers' markets; self-managed services for young people; and solutions to facilitate product sharing and exchange.

Finally, we aim to show that this is a major opportunity for the intervention of Designers who are interested in developing, promoting and eventually replicating these innovative ideas, as a way to improve city life in terms of social cohesion, environmental sustainable development and reinforcement of local economies.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

2 Introduction

The world is rapidly changing, whether we consider environmental, technological or economic transformations, or, even more significantly, whether we look at the social ones. Most appear as positive, however some bring about some problems.

Great urban concentrations bring about cultural, social and relational diversity, which in turn demand territorial transformation. The lack of policies adjusted to those transformations and the need to adapt and develop systems able to structure the social and relational fabric of cities have given birth to a phenomenon of collaborative communities in which individuals collaborate among themselves, thus promoting an active citizenship, in contrast with a certain passivity widespread in contemporary society.

It has also been observed that a growing number of organisations and institutions behave in a creative way in the contemporary knowledge society (Giddens, 1990 and 1999; Ray, Anderson, 2000) and that social innovations have been moving from the margins to the mainstream (Young Foundation, 2007).

These changes give us an opportunity to reinforce this type of behaviour through the design discipline.

As John Landry says: “if conditions are right ordinary people can make the extra-ordinary happen if given the chance” (Landry, 2005). But, the main challenge is “how to replicate some services without loosing their initial quality?”. Another challenge is the possibility to enrich the social urban fabric with these services.

Cities incubate new businesses, connect people, ideas, money and markets, and house most universities. In our increasingly diverse society they are the crucibles for connecting cultures and generating opportunity.

There are many self nominated “Creative cities” either because they have a huge concentration of creative professionals, or because they have a strong role as “art cities”. But, a creative city is, above all, one that has a creative social fabric, that is to say, a city where relationships between inhabitants are a basis for active citizenship.

Prior to the introduction and analysis of the students’ projects , it is essential to clarify some working concepts such as diffused creativity, creative communities, enabling platform and enabling solution.

3 Context

3.1 Diffused creativity

In recent years creativity has been introduced in economic and urban policies as a key resource to compete in the global knowledge economy. Many creative city strategies have focused on providing the spaces - physical and social environments – to stimulate the production of creative contents and communities, the start up of value added economic activities and the regeneration of degraded urban areas [Creative London, 2005].

Until recently, creativity has been regarded as a privilege of artists,

architects, designers, and the like (Howkins, 2001). However, there has been a growing attention to the mass creativity phenomenon, in books such as "The wisdom of crowds" (Surowiecki, 2005), "The creative city" (Landry, 2000) or "the rise of the creative class" (Florida, 2002) and in processes like crowdsourcing (companies that invite the masses to contribute ideas, which can be worked up into fully fledged business propositions, with the creators being paid in royalty fees).

Many problem solving strategies are centred in the professional activities that those problems involve, and they are often solved in traditional ways. But, according to Landry, creativity is also the ability to surpass the boundaries of each professional activity and in so doing, surpass as well the conventional way of thinking of each profession.

However, the problems contemporary society faces, do not seem to be solvable in a linear form or by traditional processes. The collapse of the Welfare state, and globalisation have created new problems and, thus, new needs. The demand for solutions and the failure to produce them through government action makes people organize themselves and with themselves to find the solutions for their problems and the answers to their needs, more often than not, in unconventional and innovative ways.

This process of innovation fosters the birth and growth of a diffuse creativity on the part of non-specialised individuals, that is, a non-professional creativity: common people who, for several diverse reasons, do (or have to) face their daily life with creative attitudes and capacities (Manzini, 2005).

This creativity is expressed in many different forms (for example, new models of public health, open source software or organic food, fair trade, pedagogical models of childcare, microcredit and magazines for the homeless), and appears as a result of a new social order. As Saint-Simon phrased it, history consists of a succession of social orders and the movement from one order to the next is triggered by the rise of a new class. Different ideas fit different periods of history. The first of the leading peculiarities of the present age is that it is an age of accelerated transition.

Mankind has outgrown old institutions and old doctrines, and has not yet acquired new ones.

What we are seeing is that society is in fact trying to acquire new ones, and this is possible through the rise of new ways of doing things.

3.2 Creative communities

From previous European research (EMUDE, in particular) it emerged, as already noted, that there exists a dynamic new form of creativity: a diffused creativity put into action co-operatively by "non-specialised" people, and this is a significant expression of contemporary society. The EMUDE research has referred to these enterprising people as creative communities. That is: groups of innovative citizens organising themselves to solve a problem or to open new possibilities, and doing so as a positive step in the social learning process towards social and environmental sustainability (EMUDE, 2006; Meroni, 2007).

Creative communities are very diverse in their nature and in the way they operate. But they have a highly meaningful common denominator: they are

always the expression of radical innovations of local systems, i.e. discontinuities with regard to a given context, in the sense that they challenge traditional ways of doing things and introduce new, very different (and often intrinsically more sustainable) ones.

3.2.1 Socio-cultural sustainability

We have known for a long time that transition towards sustainability requires radical changes in the way we produce and consume and, more generally, in the way we live (Jansen, 1993; Braungart and McDonough, 1998). In fact, we need to learn how to live better and, at the same time, reduce our ecological footprint and improve the quality of our social fabric. In this framework the link between the environmental and social dimensions of this problem clearly appears, showing that radical social innovation will be needed, in order to move from current unsustainable models to new sustainable ones (Sachs, 1999; Brezet and Hemel, 1998; Charter and Tischner, 2001; Pauli, 1997; Manzini and Vezzoli, 2002; Manzini and Jegou 2003).

3.2.2 Environmental sustainability

The aforementioned creative communities reinforce the social fabric and have great potential to promote sustainable values and sustainable behaviours. At the same time, while we can easily recognize these values and their socio-cultural advantages, it is not always so easy to find their environmental implications.

With regard to creative communities, we can observe that some of their technical and organizational choices bring clear environmental advantages like: the frequent use of renewable energy; the consumption of regional and seasonal organic food;the generally sensitive use of local resources; sharing equipment; developing collaborative services; self-producing or creating direct commercial links between producers and consumers.

3.3 Enabling platforms and enabling solutions

One of the ways to achieve a sustainable future may be by promoting the services developed by these communities, and reproducing them.

This should be the designer's sphere of action, in the sense that, as Bornstein says "What business entrepreneurs are to the economy, social entrepreneurs are to social change". This presents designers with the opportunity to develop new approaches to the activity of Design that give visibility and enhance the role of these social innovations, thus attracting others to emulate and extend these innovations. In this scenario, the opportunities for Design to intervene are located at three levels: promotion and diffusion; enhancement; and facilitation of the reproduction process.

3.3.1 Promotion and diffusion

At this level, Design can work as a communication tool, promoting the cases attractively and facilitating communication between the different knots of the network, i.e., raising the profile of these innovation forms and the services they provide.

3.3.2 Enhancement

Design can work as a mediator between the diverse actors (government entities, communities, and society at large) and as an enhancer of processes, being also responsible for designing possible scenarios that bridge creative people's visions and the visions of government entities that could help fulfill their ideas with material support.

In this context, Design is the interface not between the object and the user, but between the service and its users/promoters.

3.3.3 Reproduction

This is the level that represents the biggest challenge, as it entails the design of tools necessary to make social innovations reproducible. According to Ezio Manzini, this process consists in the conception of an enabling solution, that is, "a system that provides cognitive, technical and organisational instruments so as to enable individuals and/or communities to achieve a result, using their skills and abilities to the best advantage and, at the same time, to regenerate the quality of living contexts, in which they happen to live." (2004)

The discussion on these systems has an important background in the concept of enabling platforms.

An enabling platform is a set of material and immaterial elements that, implemented in a given context, enhances its potential to be a fertile ground for creative, bottom-up initiatives. The body of existing knowledge about this concept comes from a line of successive research projects from product-service systems (MEPSS[1] and SUSPRONET[2]) to sustainable solutions (HICS[3]).

In particular, the concept of platform was worked out in the HiCS research (Manzini, Collina, Evans, 2004). In this research some sustainable solutions were developed and their structures studied, defining the concepts of "platform" and "specific element". The specific elements of a solution are the components that make up a solution dedicated to a specific user group. On the contrary, the platform of a solution is constituted by the components that are common to all the possible specific solutions.

[1] MEPSS, Methodologies for Product-Service system, EU funded research within the Growth Programme (2001-2004), in the 5th F.P.

[2] SusProNet, Sustainable Product Development Network, under the European Commission's Fifth Framework Programme.

[3] HiCS - Highly Customerized Solutions - Solution-oriented design, production and delivery systems customized – Solutions for Specific Customers (G1RD-CT-2001-0048).

3.4 Service design

As mentioned by Morello (1995: 73),

"The need of design in services is more and more a reality; but which designer could, until today, design services? The professional figure of the designer has to be renewed to face the job; and this renewal will impose a deep revisitation of design´s conceptions".

Strategies involving new forms of knowledge and thought, promoting sustainable solutions for the creation of new scenarios are undeniably required. That is the statement underlying the design debate, and the role of design must be updated to achieve this goal.

From 2004 onwards Prof. Ezio Manzini has been experimenting in this field at the Politecnico di Milano, namely in *Service Design*, *Design Concept* and *Strategic Design* subjects.

In fact some of the cases presented in this paper have been taken from the 2007 Design Concept Lab coordinated by Prof. Ezio Manzini

3.5 Design Concept Lab 2007

The Design Concept Lab works in service design, focusing particularly on the initial *generation of new service ideas*. It broached the theme by simulating a call for entries to a competition, organised by a local development body, entitled: "**If we want to, we will! Sustainable activities at (almost) zero cost".**

The Lab tackled the question of citizen participation and mutual help to improve quality of life, with particular reference to Quarto Oggiaro, an area in the suburbs of Milan chosen for its extensive human resources and the design potential it offers. It is therefore concerned with the concept of **collaborative services:**

- services that have to do with various aspects of everyday life in a city and that seek to raise the *liveability level* in the city where they operate.
- services that resolve concrete problems by activating the people directly involved to help each other.

The whole question of mutual help leads students to concentrate on the human and social dimension of a service and observe the possibilities implicit in what already exists. Indeed, the fact that it calls for services at (almost) zero cost implies that all the value produced must be based on the capabilities of the social actors involved and on their motivation to use their own personal resources and the existing ones.

The Lab set three design goals:

- *to design an effective communication of a place:* a presentation of the distinguishing features of life in a particular neighbourhood, highlighting places and situations that potentially lend themselves to the ideation of service proposals

- *to design a service idea:* a proposal for a collaborative service, presented as a service idea (initial demand, proposed solution, how the solution will work) and enabling solution (the packet of products, services and information that will make it possible).
- *to design an effective means of publicising the service idea:* an easily understandable and communicative presentation of the proposed collaborative service.

3.5.1 Communicating a place using the Reporter's Book.

The first step towards reproducing these situations is to observe and understand the specific context. By context we do not only mean the physical and virtual space but also the social forms within them.

For a designer, observing and reporting what he has seen and perceived is unquestionably a design activity. This is firstly because observing a context and recognising its distinctive features is already part of a wider design plan that influences the designer in his subsequent choices. Secondly, communicating an observed context in all its complexity means carefully selecting what to show and how to show it. So, a designer starts his activity by observing and "listening to" a given area to uncover the demands coming from the numerous activities and subjects looking for space there, who live the place and wish to live it better.

The tool used by the designer at this pre-design stage, for both written notes and visual images of whatever comes out of his observation and understanding of the place, is the reporter's book. This is basically a presentation of the distinguishing features of life in a particular neighbourhood, highlighting places and situations that lend themselves to the conception of service proposals. The designer carries the reporter's book around with him, building up a picture of the area as he goes. He constantly adds details that had previously escaped his attention, because too visibly obvious and commonplace, but which, in another context, might seem interesting and be interpreted differently. One of the designer's aims is to try to go beyond the traditional approach to a survey investigation, thanks also to the possibility of interacting with people and organisations active in the area.

Photographs, sketches, drawings, written text, video clips, maps and symbols can all be used to record sensations, atmosphere, details, walks and encounters with people. All of these elements are part of the reporter's book. Hence people, groups of human beings, do not behave according to global criteria, but always according to criteria that are localised and concrete, the service designer can highlight the micro-sociality of face to face relationships through his observation of the everyday, and he can highlight behaviour that enhances virtuous interrelation with local resources. Understanding a context is not a neutral activity for a designer, it depends rather on the design intentions that guide him/her. We are moving in the field of service design, and specifically the design of collaborative services, so the designer will filter information as he/she observes and understands the individuality and personality of a place; on the one hand, the social fabric woven by the people who live there, on the other, bring out the territorial

quality produced by the virtuous relationships built between the community and its environment.

Communicating a context that emerges through a graphic design is a complex activity because the designer/researcher must decide what to show and how to show it. He should not paint a neutral picture of what he has observed but rather his own point of view. From here he will then start to generate design concepts.

3.5.2 Designing a service idea in Quarto Oggiaro

After an in-depth analysis of the context, we move on to the second step in the design process, which is divided into 3 stages: *existing cases and service ideas, localised proposal, and enabling solutions.*

Existing cases and service ideas: each student hunts out examples of collaborative services that are already in action – various information sources can be used in the research e.g. internet, newspapers or direct contact – focusing on the service ideas they represent. Next, he or she selects one case that looks significant and potentially relevant to the situation in Quarto Oggiaro. He then observes it carefully and identifies the underlying *service idea.*

Localised proposals: at this stage the service ideas selected are localised in Quarto Oggiaro. In small groups, the students adapt and develop the initial service idea to the specifics of the new context. They particularly focus on its most characterising aspects, such as its operational results and relational qualities, social and environmental implications, the actors involved and their motivations, economic and technical feasibility and the main physical evidence, and "localise" these in the reality of Quarto Oggiaro.

Enabling solutions: the last stage is dedicated to drawing up enabling solutions that could make it more accessible and effective. The strong and weak points of each proposal emerge from the discussion that concludes the previous stage. Actions and artefacts (material, organisational and communicative, i.e. *enabling solutions*) can then be outlined that could catalyse resources and overcome difficulties making the services more easily applicable to the specific conditions in Quarto Oggiaro.

3.5.2.1 Communicating the service idea

The last step in the Laboratory is about **communicating the service idea.** The developed concept outlines:

- the potential service offer (what is being offered),
- the targeted end-user (who it is being offered to),
- the potential added value both for the user and stakeholders (why the service should be set up),
- the actor system involved and to be involved (who will take part and in what role),
- and the way it will potentially be set up and therefore how it will be possible to interact with it (how it will be offered/used).

Presentation tools for the concept can include promotional posters, maps of the offer and/or system, actor profiles with their motivations, analysis of the strong and weak points of the project, context posters - both general (the new macro-context envisaged) and specific (the micro-context), analysis of the initial demand and, above all, posters that specify all the elements that constitute the enabling solution.

Enabling solutions

Projects generated by the Lab foster and stimulate the micro-sociality of Quarto Oggiario by meeting everyday demands using existing resources and physical spaces. These projects are **collaborative services** where the users enact the project itself. The service is flexible, personalised and economic as the users participate in its creation, development and realisation, rebuilding the social fabric and increasing the sense of belonging to civic society.

Enabling solutions for collaborative services are combinations of activities and artefacts which, in a given context, enable people to collaborate actively to achieve a result. They are therefore activities and artefacts that support the service, both at its start up and in its day to day management, while raising the level of socialisation among participants making them co-producers of the value generated by the service.

The design proposals **meet demands** for such things as increased bicycle use, enhanced urban green spaces, an exchange of skills and abilities among young people, a valorisation of the capabilities of ordinary people; they promote local multiethnic trade and facilitate relationships between apartment block residents. At the same time they seek to **solve problems** such as the utilisation of public spaces and run down areas, the management of simple everyday processes, and diffidence towards strangers and the unknown, not least towards neighbours.

The didactic experiment using the methodology described has led to the definition of various extremely interesting design concepts. Here we shall briefly describe four of them.

The **“Passaggino”** project promotes the shared use of baby equipment (e.g. prams, pushchairs and bicycles) through a hire system. The objects are hired out and returned at weekends and on national holidays so that families are able to meet up regularly and develop mutual trust. In this way families can make use of the “Passaggino” service and take part in the activities, to their double advantage: they save money by not buying objects with a limited period of use, like a pushchair, and encourage friendly relationships among their children.

The enabling solutions for this project mainly concern communication and service monitoring. The service is publicised on two levels: firstly, posters are put up in public places to explain the service, particularly in areas frequented by families (parks, nurseries etc.); then leaflets are distributed in clinics where mothers-to-be go for their check-ups and for information. In addition, on the birth of a new baby in the neighbourhood a congratulations

card is sent to the family, together with an information leaflet. The purpose of monitoring is mainly to create trust in the service and in the people who actively take part. Loan data and product life are fed into software that enables items to be traced easily, monitoring the history of both subscribers (and their experience of the service) and equipment.

This trust and transparency is supported by a membership card (by which personal data is supplied) and, above all, by an equipment identity card, which contains useful information about the history of each item, told informally by previous users with photos and memos of all kinds. This simple artefact enables contact to be made with other families, not least when there are practical problems with an item.

There is also the identity card of the association. This consists of a register containing information about any repairs, together with the product and purchase details. It is an alternative to the software (particularly at the start, when things have not been fully developed) and serves as a back-up.

Figure 1: Enabling solution's elements

"Ortinsieme" This is a service thought up to introduce the children of Quarto Oggiaro to the magic of nature, the rhythm of the seasons, and plant care and cultivation, through a didactic course that makes use of resources and open spaces available in the neighbourhood. It is run by a local association and includes vegetable gardeners in Quarto Oggiaro and the children at the local school.

The gardeners make their vegetable gardens available to schoolchildren and their teachers, and teach them how to grow fruit and vegetables. The primary school organises courses on natural cycles and takes the children to the gardens to try out what they have learnt. Through the "Ortinsieme" project, the association aims to upgrade the area and involve local residents.

Many tools have been designed for this service: from personalised guides for each actor, to a work kit for children. In the guide, supplied at the start of the school year, the design proposal is described and guidelines offered for setting up the project. Another item is a calendar, which is hung up in the school to regulate didactic activities in the vegetable gardens. Other crucial elements in identifying and recognising the project are the implements supplied to the children themselves: gloves; apron; signs to put in the gardens that adhere to the project; packets of seeds and a cardboard case (which the children put together themselves at school following the instructions) to hold everything. Another important item is the logbook (a horizontal A4 book) where, with the teachers' assistance, the children collect

pictures, stories and drawings of work done both in class and garden to report their experience.

Figure 2: Enabling solution's elements

"YouForMe" is a time bank specifically targeted for young people of 14–20 who often have limited financial resources to cover their needs such as scooter repairs, help with homework or learning to play a musical instrument.

The service centres round the mobile phone, which is a fast practical means of communication available to young people. The service structure is simple: for maximum flexibility, communication is via text messages; service requests receive a quick reply via software that searches the enrolment list; the headquarters of the youth association is a place for meeting, getting to know each other and making exchanges.

The "YouForMe" project is funded by the Quarto Oggiaro Local Council, because they wish to employ teenagers in work that is useful both to themselves and adults, reducing the danger of "boredom" and obtaining a service that is socially useful to young people and the community.

The distinctive features of the project are the way it is publicised (through a promocard distributed in bars and meeting points), its organisation and management (through its internet website, enrolment forms indicating services offered and required, and its software, set up to manage communications automatically between "YouForMe" and its users via mobile phone, using coded language), its recognisability (through the use of a special alphabet that cultivates a sense of belonging to a group being a language specific to "YouForMe", and not least, it is cheap (as a reward to the most active users, their phone are recharged by the Local Council).

Figure 3: Enabling solution's elements

"T-andem": the aim of this service is to teach the art of bicycle maintenance. The cycle repair shop is located at the centre of an already existing network of cycle paths, in a large square closed to traffic, with arcades that enable the bikes to be repaired out of the rain even in the winter months. The decision to locate the service in this particular square was also due to a need to upgrade the square making it more attractive to local young people. The cycle repair shop is run by a local no-profit association that operates various activities in the area. The most active members of the local community help the association with this activity by organising themselves into shifts to supply a constant, diversified service offer.

The enabling solutions consist of: communication tools to publicise the service (a website that enables even users outside the neighbourhood to be reached, a leaflet about the opening celebrations, posters and leaflets that explain the workshop's activities); organisation and management tools (a chart showing the shift rota and timetable, and the database designed to link all the cycle repair shops in Milan together in a network, creating an on-line store for the exchange of spare parts and other materials); tools to foster a sense of identity and belonging (a membership card and t-shirt with the T-andem logo that make young people feel they are part of a group), items that foster cost reduction and fedelity (a bicycle hire card giving access to discounts).

Figure 4: Enabling solution's elements

All these tools and activities together support members of the community in the co-production of the service, helping them to optimise the running of the cycle repair shop in a flexible way.

Through design experimentation in the Lab it was suggest that, although the projects differ widely from one another, the enabling solutions they require have at least six features in common:

1. trust
2. recognisability
3. sense of identity/belonging
4. promotion
5. organisation/management
6. low cost

To better understand these concepts, we refer each concept to each project and its elements of the enabling solutions.
So, regarding the feature "trust" we can relate it to:

Weekly party, software, membership card and identity card (“Passaggino”)
Enrolment forms (“YouForMe”)
As well as for “recognisability” we have:
Work kit (“Ortinsieme”)
Alphabet (“YouForMe”)
T-shirt and merchandising (“T-andem”)
The “sense of identity/belonging” is represented by:
Work kit and logbook (“Ortinsieme”)
Membership card and t-shirt (“T-andem”)
To the feature “promotion” we assigned :
Posters, congratulations card & information leaflet (“Passaggino”)
Promocard (“YouForMe”)
Website, leaflet and posters (“T-andem”)
Regarding “organisation/management”:
Software and Identity card (“Passaggino”)
Personalised guides and calendar (“Ortinsieme”)
Website, software and enrolment forms (“YouForMe”)
Timetable and database (“T-andem”)
And finally, the feature “low cost” can be represented by:
Rechargeable Phone Cards (“YouForMe”)
Hire card (“T-andem”)

4 Overall conclusion

The shift to an environmentally sustainable scenario requires the involvement and participation of all citizens, and that can only be achieved if, through the widespread promotion and diffusion of new forms of consumption, civil society takes these problems to heart and acts upon them. These projects presented here, in their differences as much as in their similarities, show that it is possible to replicate social innovation cases in other contexts throughout service design.

The main objective is to facilitate the entire implementation process with the design of common elements that are context adapted.
We can also see, that it is possible to develop new responses to the problems contemporary society faces. Social entrepreneurship, with the cooperation between multiple actors and the economic activity that lie behind it, must be diffused and supported by design.

In every case a desirable social change is envisaged in tune with sustainability be it environmental, economic or social.

Designing lives and lifestyles is not Design’s mandate, nor is it a desirable option. Renewing and revitalising social networks through creative approaches requires the involvement of local people as active participants in a variety of design projects. The designer’s role is to work with people and their needs and aspirations to create new answers to pressing problems, which are not dealt with efficiently in traditional and conventional ways. If we believe that today everybody designs their life to some extent, then the professional designer should work together with this army of spontaneous and intuitive designers in order to structure and develop their creative, and often innovative, solutions. This should result in a more fertile process, as

the user formulates a more accurate idea of his needs, and the professional designer a more objective approach to problem solving – merging the two is the key to develop sustainable and groundbreaking solutions, which are also replicable.

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Chapter 20 Energy Saving Performance Contracting for Federally owned Public Buildings – Factors of Success

The Austrian Perspective

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1 Introduction

In the course of our research project (Tisch et al., 2008), we tried to identify and analyse barriers linked to the implementation of Product-Service-Systems (PSS) in public procurement in Austria and strategies to deal with them. Although several studies proved that Product-Service-Systems are able to offer attractive solutions within the scope of sustainable development, currently in public administration, PSS are used only to a small extent.

The first step within the project was to collect and analyse opinions and experiences made by public authorities and companies. In-depth interviews with 20 officers responsible for public procurement and 10 employees of companies that offer Product-Service-Systems were carried out. The results of these interviews were used to develop two questionnaires, one was sent to more than 3.000 Austrian public procurers, and the other was distributed to 250 companies. 88 responses of public procurers and 35 responses of companies were received. Based on the results of the interviews and the questionnaires, we identified hindering factors and strategies to overcome them. We discussed these strategies with users and providers of selected Product-Service-Systems in three round-table-meetings.

During our research, we discovered an extremely successful example for Product-Service-Systems where several strategies for the management of barriers were effectively adopted: Energy Saving Performance Contracting for federally owned public buildings in Austria.

This paper starts with a description of Energy Saving Performance Contracting, a system that becomes more and more attractive. Then, the contracing-initiative for federally owned public buildings in Austria is outlined.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme

Three of the main factors of success are presented:

(a) A tender that is designed to select a well-experienced and powerful contractor and a contract that guarantees the participation of users.

(b) A concept that highlights the advantages contracting offers to the user and

(c) an independent third party. This seems to be the most important factor as the third party is able to win new users for the contracting. Furthermore it can support the user in the selection of the right contractor and in the implementation of the contracting-system.

The paper ends with an exposition of the experiences made that could help other Product-Service-Systems to become more successful in public procurement.

2 Energy Saving Performance Contracting

According to the definition in our project, a Product-Service-System incorporates products and services that are designed to fulfil the user's needs in an optimal way. The companies that offer PSS are focussing on the sale of the desired benefit and not on the sale of a product. In order to achieve this, they change the perspective and make possible the creation of new solutions. PSS are particularly interesting with regard to their potential environmental effects, when comparing them with those associated solely with the purchase of a product.

Energy Saving Performance Contracting is an example for a Product-Service-System. It is an agreement between the owner of the building and the energy service company (contractor) that guarantees a specified saving of energy. The contractor finances, installs and maintains activities to reduce the energy consumption of the building. Principally, the contractor is paid according to the energy that he provides. The payment of the contractor should equal the energy savings which results from the new contract. At the end of the Energy Savings Performance contract, the customer owns the renewed equipment and the benefits of all further savings. Energy performance contracting is an extremely effective way to reduce energy use and costs, renew facilities and building systems without expending capital funds.

2.1 The Austrian Contracting-Initiative

In the past, due to a tight budget, the federal government in Austria often had to put on hold energy saving investments in federal buildings.

In 1997 the idea to implement Energy Saving Performance Contracting in federal schools in Vienna was formulated on the basis of a pilot project. After a first analysis of specific energy indices and the condition of the school buildings, two pools with a total of 46 schools were chosen for the pilot project. In 1998 a contract was signed with two contractors who guaranteed the reduction of 24.3 % (pool 1) respectively 21.1 % (pool 2) of energy use.

In 2003, after the positive results of the pilot project, the federal government decided to expand the contracting-initiative: Currently, numerous Austrian schools, ministries, barracks and universities have a contractor who will be informed in case of emergencies, for example when the school bell does not ring.

2.2 Factors of Success

The example of Energy Saving Performance Contracting for federally owned public buildings offers several strategies to overcome hindering factors for Product-Service-Systems, both for those public authorities which are already using PSS as well as for those, which do not. In the following, three main strategies or factors of success are presented that were both mentioned during our in-depth interviews and the questionnaires as well as during the round-tables discussions. All three strategies are pursued in the Austrian contracting-initiative.

a) Tender that ensures a premium contractor and the participation of the user

The evaluation of the questionnaires produced the *long-term bond to the contractor* as the most significant hindering factor to the implementation of Product-Service-Systems for those public authorities who already use these systems. At the same time, as one of the experts pointed out, the custodians of public buildings often require a contact person to whom they can relate, because otherwise most of them tend to be overstrained. For example the school custodian could be overburdened with the variety of questions concerning the heating system, the thermal insulation of the building or the behaviour of the occupants concerning energy efficiency. Therefore, it seems that in the field of energy contracting the core problem is not the long-term bond to the contractor but the bond to a contractor who is not competent enough and the absence of possibilities for the occupants of the building to take part in the decisions of the contractor. As one of our experts put it, very much is destroyed by choosing the "wrong" contractor, not only in the public authority itself, but also in those authorities the public authority is in contact with.

In Austria, the tender and the contract are designed according to the following principles, in order to ensure a premium contractor and the possibility of user participation:

So called *negotiated procedures* are chosen as procedure for the award of contracts. In the first step of this procedure, appropriate bidders are selected. In a second step, those bidders are invited to the tender. It is important to mention that the offers are not only compared on the basis of the lowest price. The contract is awarded to the economically most advantageous tender that applied other award criteria like practical experience of the contractor or methods chosen by the bidder to motivate the occupants of the building to save energy (for example a board that shows the current energy-use in the building, energy-sheriffs who make sure that i.e. the light is switched off or regular meetings for the operating staff like the custodians). The best offer is chosen by a jury that includes occupants of the building.

The contract that runs over a period of 10 years is based on a model contract developed by the Austrian Energy Agency, a science-based union, widely appreciated in Austria. It makes high demands on the contractor and establishes for example the comfort-conditions like room-temperature. In the contract, the possibilities for the participation of occupants are defined, too. For example, the ways in which the occupants can influence decisions of the contractor where to invest in the building, are fixed in the contract. This helps to overcome barriers like the fear of low temperatures or the fear to be at the mercy of the contractor.

b) Concept that highlights the advantages for the user

The questionnaires sent to officers responsible for public procurement showed that nearly 2/3 of those who did not use Product-Service-Systems couldn't *recognise* their *benefits*. The Austrian contracting-initiative deals with this problem by pointing out the advantages to the users of the buildings. It is not only that the initiative informs the potential users about the benefits but that the whole initiative is designed in a way that the advantages offered are diverse and can easily be recognised:

1. Users profit from 20 % of the reduction of the costs of energy.
2. Users profit from the upgrading of their buildings and its technical systems.
3. The users obtain partners that guarantee a certain outcome, for example the minimum temperature of a swimming pool. In case of serious technical difficulties, the contractors are obliged to solve the problem within a couple of hours.
4. The contractor implements permanent measures that aim at encouraging and motivating the occupants to save energy. By changing the daily habits of the occupants of the building, further energy savings in their private homes are possible.

c) Independent third party which has the trust of the user

The evaluation of the questionnaires of those public authorities which did not use Product-Service-Systems shows two main hindering factors: *a tendering procedure that is feared to be long and complex* and the *lack of external assistance*. Both hindering factors can be overcome with the help of an independent third party that the users trust. In the field of Energy Saving Performance Contracting for federally owned public buildings the existence of such a third party seems to be the most significant factor of success.

In this particular case, it is the Ministry of Deployment and Economy with its *special emissaries for energy* that assumed the role of the independent party. These special emissaries for energy, launched by the ministry in the end of the 1970ies, were assigned the task to support the government departments to save energy. They recorded the heating systems and other energy technologies, identified energy indices and suggested improvements. Therefore, they were in contact with the relevant persons in most of the federally owned buildings and normally enjoyed their confidence and also knew quite well the buildings and their problems regarding energy savings.

In the course of the Energy Saving Performance Contracting they are assigned with different functions:

1. *Inform and motivate:* In the run-up to the tender procedure, the energy emissaries carry out talks and workshops with those governmental departments chosen to be of interest to the contracting-initiative. They reveal the benefits of the Energy Saving Performance Contracting and inform the potential participants of the following steps and possible results. They try to diminish their fear of this system unknown, a further hindering factor mentioned by an expert.
2. *Carry out the tender procedure and give support:* After the governmental departments decide to take part in the contracting-initiative, the energy emissaries carry out the call for tenders. Fur-

thermore they support the users during the operating time of the contract by controlling the account of the contractor or by organising annually meetings between contractor and users.

3. *Act as arbitrator:* In case of conflicts between users and contractor, they act as arbitrator.

With the decision to assign the special emissaries for energy with the promotion and management (monitoring, controlling etc.) of the Energy Saving Performance Contracting, the Ministry of Employment and Economy did not only chose trusted and well informed managers but also made sure that those people would not lose their employment in the process of the implementation of the Product-Service-System.

2.3 Lessons to be learned for the implementation of other Product-Service-Systems in public authorities

It seems that especially for those Product-Service-Systems that are more complex and innovative than the copier-service-system, public authorities need a third party that informs, motivates and supports (potential) users and acts as intermediary between users and providers. Not only during the introduction of the Product-Service-System but also during its execution. It is important that this *third party* is trusted by both, the users and the providers. Therefore an independent and competent third party should be chosen.

Further findings in Austria strengthen the importance of a third party in the course of the implementation of Product-Service-Systems in public authorities. Currently, there is a slight push towards Product-Service-Systems in public authorities in Austria that originates from the central procurement agency. They support more recent Product-Service-Systems that offer cost-benefits or legal certainty (like printer-service-systems or car-pools). To some extent, the central procurement agency acts as a third party: it reveals the benefits, informs about the Product-Service-System and could even assume the role of the arbitrator in the case of differences.

Therefore, those who want to implement Product-Service-Systems in public authorities should look for an institution that is able to act as a third party.

This conclusion could be of importance for Product-Service-Systems in private procurement, too. Recent research regarding the implementation of new Product-Service-Systems reveals problems (Rabelt et al., 2007). Even if the concept was convincing, several Product-Service-Systems couldn't gain ground. Some of the research projects (e.g. Ax, Becker, 2007; Faltz et al. 2007) where one of the research institutes took over the part of the third party, pointed out the importance of an intermediary unwillingly. There are cases where the Product-Service-Systems lasted only as long as the life span of the project. It seems that in the discussion about Product-Service-Systems so far the importance of a third party that permanently supports the system is underestimated.

In the case of the Energy Saving Performance Contracting a *tender* procedure was chosen, that guarantees a highly qualified provider. The results of our interviews and round-tables shows that this is already taken into account by procurement officers who procure other Product-Service-Systems like the rental of textiles for medical use. In some cases it seems to

be difficult to define the quality of the providers' performance in the tender in a way that ensures that the company that offers the best quality is chosen.

Tenders that don't address Product-Service-Systems exclusively should consider a couple of points to allow Product-Service-Systems to be taken into account:

1. use performance-based or functional specifications
2. take account of variants which can be submitted by the participants in the tender
3. use a life-cycle costing approach
4. award the contract to the economically most advantageous tender and not to the tender with the lowest price

The current initiatives of the European Union and its member states (e.g. BMWA, 2007) aim to support innovations through public procurement. They make suggestions for the legal and procedural framework of procurement procedures. Once applied in the day-to-day business of procurers, it should be easier for Product-Service-Systems to be captured by public authorities.

The separate cost accounting is the basic principle that allows the procurement officers to *identify potential cost-benefits of Product-Service-Systems*. In the case of Energy Saving Performance Contracting the special energy emissaries made sure, that the life cycle costs of the energy supply in federally owned public buildings were evident. The providers of other Product-Service-Systems are less fortunate. For example many smaller public authorities are not aware of the precise costs that their street lighting implicates. Therefore they are not able to evaluate whether a contracting-solution for street lighting offers any cost-benefits. It seems that with the current initiative of the European Union mentioned above, the separate acquisition of costs and the life-cycle costing approach are going to gain ground in public authorities.

3 Overall Conclusions

The example of the Austrian contracting-initiative for public buildings makes clear that in some cases public authorities are able to lead the way towards sustainable development.

It the case described in this paper, the public authority presented a solution that not only reduces energy consumption and costs but also offers an appealing concept that is able to overcome difficulties and offer diverse advantages: After the life span of the contract, which is 10 years, the public authorities will have gained wide experiences in the field of efficient energy supply of buildings. In addition there is hope that the occupants of the buildings will behave more energy efficiently.

An obstacle that couldn't be overcome by the contracting-initiative is related to the budgeting of the federal government. The implementation of further Product-Service-Systems in public authorities would be easier, if the users or occupants could profit directly from the savings. In the contracting-initiative the users of the building currently profit from 20 % of the reduction of costs. Even though the occupants that changed their habits and made

theses savings possible (ventilate the room in an energy-efficient way, etc.) don't always profit directly.

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Quantitative assessments (1)

Chapter 21 Development of a Model for Estimation of Household Consumption and Environmental Load Generation

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1 Objective

To deal with environment problems, not only technological innovations, but also changes of life style and improvement of social system are necessary. In this research, we observed the household. Household consumption is a source of generation of environmental load. We developed a model which showed the relationship between household consumption and environmental load generation. We applied the model to Japan till 2030 and estimated the amount of environmental load to estimate the effect of "green lifestyle" quantitatively.

2 Framework of the model

This model consists of two modules; "goods and service preference module" and "material and energy balance module". Goods and service preference module is based on Becker's household production approach and we estimated the consumption expenditure with this model. In material and energy balance module, we estimated the environmental load from estimated consumption expenditure.

2.1 Goods and service preference module

This module (Fujiwara et al., 2002) is based on the economical household production approach (Becker, 1965), (Becker and Michael, 1973). Nesting structure of household production in this module is showed in Figure 1. In this module, household produces commodities by consuming goods, services and time under constraint of income budget and time budget. Household produces utility from these commodities and decides his consumption plan to maximize his utility.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

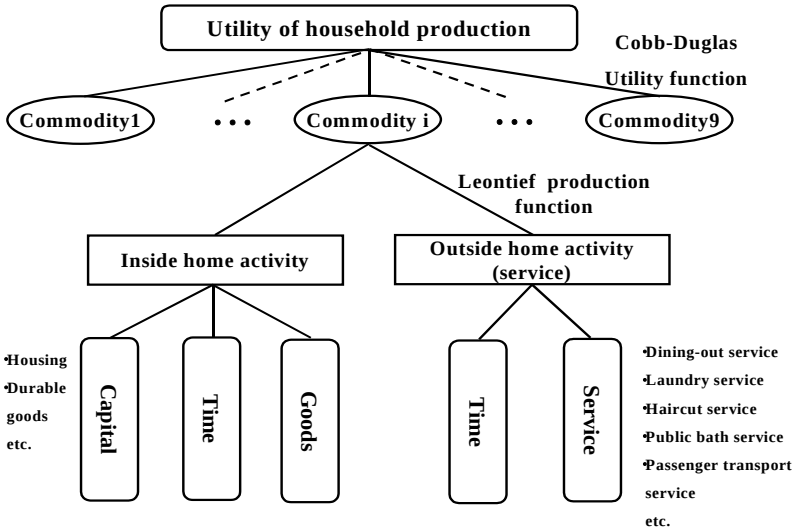

Figure 1: Nesting structure of household consumption

The production function of Becker's commodity Z_i is

$$Z_i = Z_i\left(x_{i1}, x_{i2}, \Lambda, x_{ij}, \Lambda, x_{iJ_i}, t_i; R_i\right) \quad \left(j = 1,2,\Lambda, J_i\right) \qquad (1)$$

Where x_{ij} is an input of the j-th goods purchased in order to produce Z_i, t_i is an input of the time and R_i is other variables.

It is assumed that the fixed quantity of goods and time is always needed, in order that the household produces one unit of Z_i.

$$x_{ij} = a_{ij} Z_i$$
$$t_i = b_i Z_i \qquad (2)$$

Where a_{ij} and b_i are fixed input-output coefficients. Concrete form of producing Z_i is a Leontief type function shown by the equation (3).

$$Z_i = \min\left\{ \min_j \left\{ \frac{x_{ij}}{a_{ij}} \right\}, \frac{t_i}{b_i} \right\} \qquad (3)$$

It is assumed that $b_i = 1$, without losing generality.

Production of commodity is executed under of disposable income and time. That is, the total household expenditure to the goods and service must satisfy budget constraints conditions.

$$S + \sum_i \sum_j p_j x_{ij} \le I \qquad (4)$$

Where S is saving, p_j is the price of x_{ij}, and I is disposable income.

On the other hand, the sum of the time supplied to production of commodity and the time spent for work must be less than total available time T.

$$\sum_i t_i + t_w = T \qquad (5)$$

Where t_w is the time spent for work. Moreover, the following equation is derived from the relationship between income and working hours.

$$wt_w + V - K = I \tag{6}$$

Where w is the average wage rate, V is unearned income(other income), and K is non-living expenditure such as taxes and social insurance premiums. I is substituted from equation (4) and equation (6),

$$\sum_i \sum_j p_j x_{ij} \le wt_w + V - K - S \tag{7}$$

Hence, the separate goods and time constraints can be converted into a single total resource constraint by substituting for t_w from equation (5).

$$\sum_i \sum_j p_j x_{ij} + w\sum_i t_i + S \le wT + V - K \equiv F \tag{8}$$

Here, Becker call this F as full income. From equation (3) and equation (8), following equations are derived.

$$\begin{aligned}\sum_i \sum_j p_j x_{ij} + w\sum_i t_i &= \sum_i \sum_j p_j a_{ij} Z_i + w\sum_i Z_i \\ &= \sum_i \left(\sum_j p_j a_{ij} + w \right) Z_i \\ &= \sum_i \pi_i Z_i\end{aligned}$$

$$S + \sum_i \pi_i Z_i \le F \tag{9}$$

$$\pi_i = \sum_{j=1}^{J} p_j a_{ij} + w$$

π_i is a sum of the cost of goods per unit of Z_i and opportunity cost of time.

It is assumed that the preference of Z_i is described by maximizing a utility function.

$$U = f(Z_1, \Lambda\ , Z_i, \Lambda\ , Z_n) \to \max \tag{10}$$

As a concrete form of $f(Z_1, \Lambda\ , Z_i, \Lambda\ , Z_n)$ of the equation (10), we hired a Bernoulli Laplace type preference function.

$$U = \prod_{i=1}^{n} (Z_i - \beta_i)^{\alpha_i}\ , Z_i > \beta_i, \alpha_i > 0 \tag{11}$$

α_i is a parameter which shows the strength of preference of Z_i, and if law of diminishing marginal utility is assumed, $\alpha_i < 1$. Constraint of $\sum_i^n \alpha_i = 1$ is also given to this α_i.

Maximization of equation (11) is solved with constraint (9). Although it can't solve if S relates to Z_i and dependence is not defined in that case, this S is considered as exogenous variable in this paper.

$$\pi_i Z_i = \pi_i \beta_i + \alpha_i \left(F - S - \sum_{i=1}^{n} \pi_i \beta_i \right),\ \ i = 1, \Lambda\ , n \tag{12}$$

2.2 Material and energy balance module

By material and energy balance module (Kanamori et al., 2002), the amount of generated environmental load is estimated from the household expenditure. Outline of this module is shown in Figure 2.

Estimation of amount of purchased goods (packaging material is not included) is showed in equation (13).

$$X_{j,t} = E_{j,t} / p_{j,t} \tag{13}$$

Where $X_{j,t}$ is an amount of purchased goods, $E_{j,t}$ is household expenditure and $p_{j,t}$ is the price of goods *j*.

Amount of packaging material which is carried in household is

$$XP_{j,t} = c_{pc,j} \cdot X_{j,t} \tag{14}$$

Where $c_{pc,j}$ is the rate of packaging material carried in to the amount of purchased goods.

Material and energy balance equation is

$$WG_{w,t} = \sum_{j \in NDG} C_{j,w} \cdot X_{j,t} + \sum_{j \in DG} C_{j,w} \cdot D_{j,t} \tag{15}$$

Where NDG and DG are indexes of non-durable goods and durable goods respectively, and $WG_{w,t}$ is an amount of environmental load, $C_{j,w}$ is a coefficient to convert goods to environmental load (environmental load coefficient), and $D_{j,t}$ is an amount of durable goods disposal. The relationship of stocks is shown by equation (16).

$$S_{j,t+1} = S_{j,t} + X_{j,t} - D_{j,t} \quad j \in DG \tag{16}$$

$D_{j,t}$ can express by equation (17) using $\tilde{f}_j(x)$ which is disposal rate function *x* years after purchase.

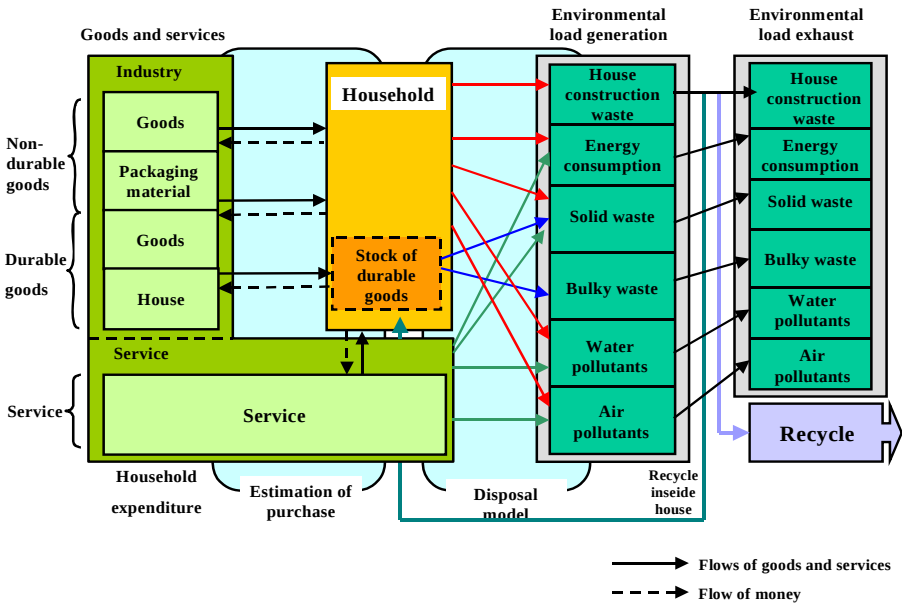

Figure 2: Framework of material and energy balance module

$$D_{j,t} = \sum_{x=1}^{\infty} \tilde{f}_i(x) \cdot X_{j,t-x} \tag{17}$$

$\tilde{f}_j(x)$ is approximates with a Weibull function (equation(18)), and it rectifies so that the sum may be set to 1.

$$\tilde{f}(x) = m_0 \cdot \left(\frac{x}{\eta}\right)^{m-1} \cdot \exp\left\{-\left(\frac{x}{\eta}\right)^{m}\right\} \tag{18}$$

$$\sum_{x}^{\infty} \tilde{f}(x) = 1 \tag{19}$$

The equation of generated environmental load WG_t^j from the j-th service sections which produce substitutable house service, e.g. dining-out, laundering, is shown in a equation (20).

$$WG_t^j = \left(E_{j,t} / p^j\right) \cdot UW^j \tag{20}$$

Where UW^j is an amount of generated environmental load per unit service, p^j is the unit price of service *j*.

3 Estimation and result

In this research, two parameters α_i and β_i about a preference function were estimated with the time use data, prices of goods data, amount of goods data and wage rate data from 1987 to 2001, using 3SLS method by TSP.

A per capita household consumption expenditure projection was estimated using these two parameters and the future scenario of the economic growth rates from 2002 to 2030 with goods and service preference module. Then, the household consumption expenditure of the future Japan is estimated using the future scenarios of population change, and change of the number of households. This household consumption expenditure was considered as an input of material and energy balance module, and the amount of generated environmental load was estimated.

The household type was taken into consideration as a factor which affects a household behaviour. The household type was classified into four kinds; single-person household (type A), household with husband, wife and unmarried child or no child (type B), the household with single parent and unmarried child (type C), others (type D).

Commodities were classified into 9 kinds (Table 1), and about 300 kinds of goods and services according to the classification of Japan's inter-industry relations table.

Table 1: Commodity Classification

Classification	Details	Examples
Clothing (CLO)	Commodities for wearing clothes	Purchase of cloth, cleaning
Food (FOO)	Commodities for having meals	Preparation of meals, purchase of food goods
Housing (HOU)	Commodities for good dwelling environn	Securing and maintenance of house, purchase of air conditioner
Education (EDU)	Commodities for education	School expenses, time for lessons and commuting
Other housework and care (OHC)	Commodites for housework and care not included under clothing, food, and	Time for housework and care
Health and personal care (HPC)	Commodities for maintaining sound life	Time for personal care, purchase of cosmetics
Recreation (REC)	Commodities for enjoying recreation	Time for sports and trips, cost of a tour
Sleeping (SLE)	Commodities for sleeping	Time for sleeping, purchase of bedding
Other (OTH)	Commodities not included above	Others

We considered outside services which are substitutable with the household production activity; dining-out service, laundry service, haircut service, public bath service, passenger transport service.

The strength of preference (α_i) is showed in Table 2. The pereference strength which is related to pereference essential for living such as clotihing and food is large in type3 and is small in type 1. And, pereference strength which is related amusement is large in type1 and is small in type 3. This is because type1 mainly consists of single young people and senior citizens who don't have a family to feed, so they consume more goods and services related to amusument. And type 3 is considered to reflect the economic difficulties experienced by single mothers rasing children (Type 3 mostly consisuts of single-mother households with children).

Table 2: Parameter α_i (Strength of preference)

The household consumption expenditure of Japan by 2030 is shown in Figure 3. And the amounts of generated environmental load till 2030 are shown in Figure 4 - Figure 7.

The growth of the household consumption expenditure had large type A. On the other hand, growth was small in type C or type D.

With a peak of 2023, the amount of generated household garbage will start to decrease. The cause of this increase is caused by household consumption increase with economic growth. Then, the influence of population reduction reverses the trend.

In Figure 5, it contains the CO_2 emissions by residential energy consumption (electricity, gas and gasoline etc.), and by passenger transport service.

The increase continues till 2030. 45% of CO_2 emissions are related to traffic. This is the result of extending the consumption expenditure about traffic greatly.

The results of non-wooden and wooden house construction waste are shown in Figure 6 and Figure 7 respectively. The amount of non-wooden

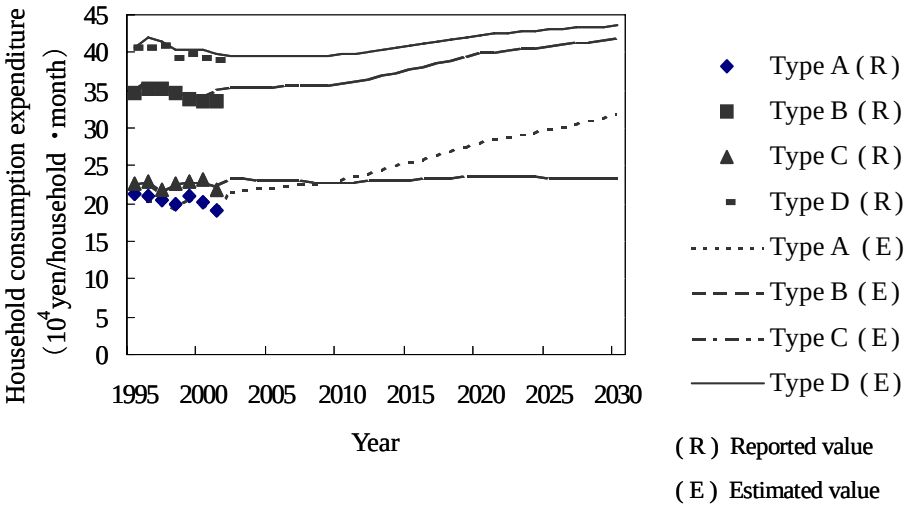

Figure 3: Household consumption expenditure

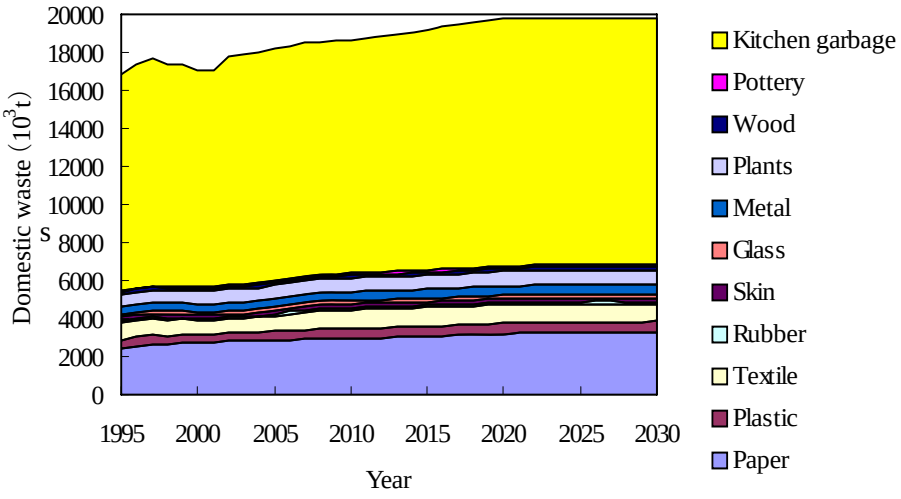

Figure 4: Solid waste from household activities
(Packaging materials are not included)

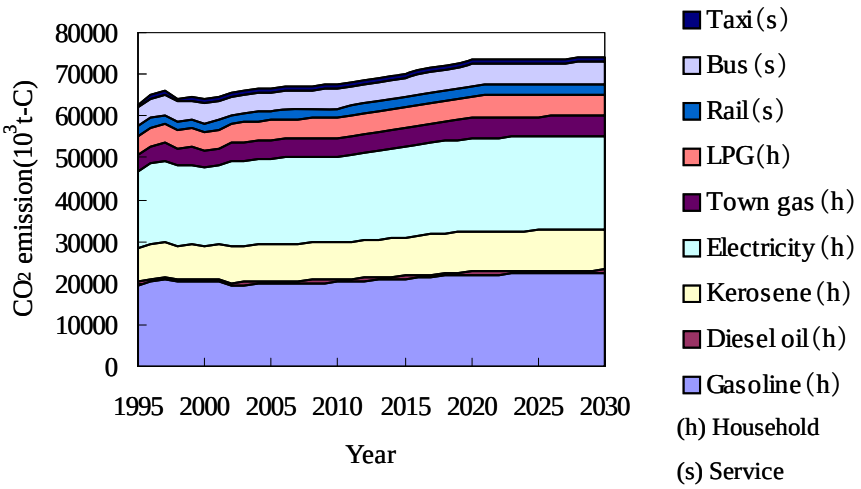

Figure 5: CO_2 emission from household activities

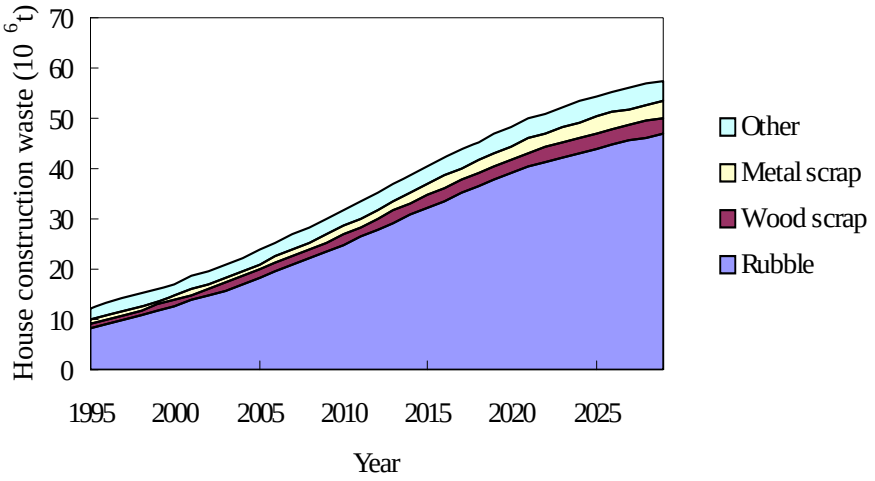

Figure 6: House construction waste (Non-wooden house)

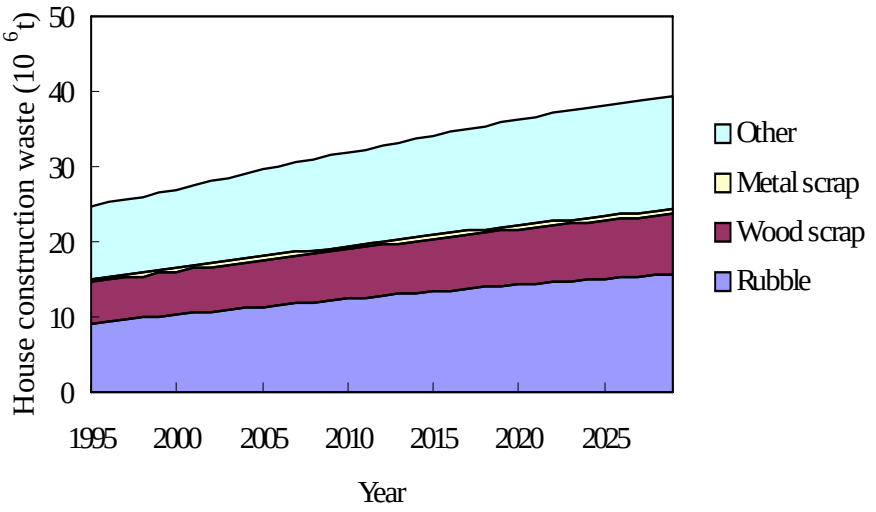

Figure7: House construction waste (Wooden house)

and wooden house construction waste generating in 2030 will become 3.36 and 1.46 times compared with 2000 respectively. The increase of house construction waste from a non-wooden house is remarkable. This result was influenced by the amount of demolition wastes from the non-wooden house which increased rapidly after World War II. It is thought that the increase in the amount of house construction waste becomes a big problem.

4 Final remark

In this research, we developed a model which evaluates quantitatively environmental load generations with change of a life style. The amount of generated environmental load and the household consumption expenditure by 2030 of Japan was estimated using this model. However, in this paper,

we did not analyze sufficiently the role of inside home activity and outside home activity from the view point of servicizing society.

We would like to evaluate the influence of such kinds of macro-scopic social trends quantitatively on generating of environmental load.

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Chapter 22 The Water Footprint of the Netherlands

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1 Introduction

Today, agriculture providing food, bioenergy and materials requires about 86% of the worldwide fresh water use (Hoekstra and Chapagain, 2007a). In many parts of the world, however, the use of water for agriculture has to compete with other uses such as urban utilization and industrial activities (Falkenmark, 1997; Postel et al., 1996; UNESCO, 2006). The lack of water in water scarce regions can be solved by importing agricultural commodities (Hoekstra and Chapagain, 2007b). These so-called virtual water flows that go along with the trade of commodities have an impact on the water balance of the countries where commodities are produced. Water scarcity is not always the reason for import, however. Much of the Dutch trade is governed by comparative advantages and disadvantages in Dutch production, subsidies, trade agreements and trade barriers. Also other natural resources needed for the production of agricultural commodities can be scarce. In the Netherlands, the main reason for import is land scarcity in combination with demand for commodities that cannot be grown in the Netherlands itself (Gerbens-Leenes, 2006). Examples of the latter are coffee, cotton, soybeans, rice and wheat of a desired quality. Along with the import of these agricultural commodities, the country imports large quantities of virtual water.

Natural capital - air, land, habitats and water - is essential for the functioning of the natural environment that performs functions essential for human existence and life on earth (Costanza and Daly, 2002). The availability of water, for example, is a constraint for plant growth. Not only agriculture needs water for crop production, nature also needs water for biodiversity. Biodiversity is not spread evenly across the earth but follows complex patterns determined by climate, geology and the evolutionary history of the planet. These patterns are called ecoregions. The World Wildlife Fund (WWF) defines an ecoregion as a large unit of land or water

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

containing a geographically distinct assemblage of species, natural communities, and environmental conditions (WWF, 2007).

A tool that addresses international virtual water flows is the concept of the water footprint. This tool has been introduced by Hoekstra and Hung (2002) and has been developed further by Chapagain and Hoekstra (2004). Those authors define the water footprint as the total annual volume of freshwater used to produce the goods and services related to a certain consumption pattern. It shows water use for consumption, termed utilization, inside and outside the national territory. The water footprint is calculated by combining data on utilization with data on trade and production. Results are expressed as m^3 per capita per year or on a national level. Globally, the main virtual water flows are related to utilization of soybeans (11%), wheat (9%), coffee (7%), rice (6%) and cotton (4%) (Chapagain and Hoekstra, 2004).

The Netherlands is a country showing an affluent consumption pattern, including large quantities of livestock products, stimulants, and the availability of commodities from all over the world (Gerbens-Leenes, 2006). In combination with large import flows and a well developed agricultural and food industrial sector, this makes the Netherlands an interesting subject for a case study into the impact of the external water footprint (WFP), the footprint outside its national border. To make Dutch consumers and producers aware of the impact of their consumption pattern and production system on water resources in ecoregions outside the country, this study aims to identify the most relevant virtual water flows related to the Dutch consumption pattern. The specific questions this study will address are:

1. Which two commodities contribute most to the Dutch external water footprint?
   - Which commodities or categories of commodities have the largest contribution?
   - What is the origin of these imported commodities?
   - What is the ratio of the internal and external water footprint?
   - What is the impact of production on water resources in the exporting country, especially in countries outside Europe and North America?
2. Which companies play an important role in importing or manufacturing these commodities?
3. Are there options for change for business for the two commodities with the largest contribution to the Dutch external water footprint?

The answers to questions one and two intend to provide information for awareness raising of consumers as well as of business. The answers to questions two and three can form a basis for corporate options for change. In this way, the study can play a role in raising awareness on the water scarcity issue, as well as provide insight into options for change. The WWF Netherlands will use the study as a background document for the upcoming WWF footprint campaign 2008.

2 Methods

2.1 System description

Agriculture, by far the largest user of water, provides commodities from primary and secondary production systems. Primary production grows crops,

such as wheat or cotton, secondary production provides livestock commodities such as meat and milk, using feed crops from primary production or wastes from the processing industry. Figure 1 shows a simplified overview of a production chain applying commodities from agriculture. It shows that the output of agriculture passes several links of a production chain before it reaches the consumer. Physical streams flow from agriculture to the processing industry, retailing and finally to individuals (Gerbens-Leenes, 2006). Sometimes, streams flow in the opposite direction. These opposite streams concern waste streams that are reused in an earlier stage of production, for example, for livestock feed. Today, large trade streams of commodities take place on a global scale level so that individual countries show large import and export streams (FAO, 2007).

2.2 The virtual-water content and the water footprint

The virtual-water content of a product (commodity, good or service) is defined as the volume of freshwater used for the production of that product at the place where it was actually produced (Hoekstra and Chapagain, 2007a). It refers to the sum of the water use in the various steps of the production chain as shown in Figure 1. In this respect, the term virtual indicates that most of the water used is not contained in the product itself. In general, the water content of products is negligible compared to their virtual-water content. Calculations are made by summing daily crop evapotranspiration (mm day-1) over the growing period of the crop. For livestock products, the virtual-water content is calculated by summing the virtual-water content of the feed, drinking water and cleaning water over the total life span of the animal. The virtual-water content of processed products is calculated by taking the contents of ingredients for the final product into account. The majority of water use occurs in the first step of the production chain, i.e. growing crops.

International virtual water flows related to trade are calculated by multiplying trade volumes by the specific virtual-water content of the commodity. Virtual-water consists of three components: green, blue and gray virtual-water. The green virtual-water content of a product refers to the rainwater that evaporated during the production process, mainly during crop growth. The blue virtual-water content of a product refers to the surface and groundwater applied for irrigation that evaporated during crop growth. The gray virtual-water content of a product is the volume of water that becomes polluted during production. It is defined as the amount of water needed to dilute pollutants emitted to the natural water system during the production process to the extent that the quality of the ambient water remains beyond agreed water quality standards (Hoekstra and Chapagain, 2007a).

The water footprint of an individual or a country (WFP) consists of the total volume of water used (m^3 $year^{-1}$), directly or indirectly, to produce goods and services consumed by the individual or the country (Chapagain and Hoekstra, 2004). The WFP has two components, an internal and an external WFP. The internal WFP is defined as the use of domestic water resources related to a country's utilization, while the external WFP is defined as the use of water resources in other countries related to utilization in the country concerned. The WFP is often expressed as the average WFP per capita per country (m^3 $capita^{-1}$ $year^{-1}$). More detailed information on the

WFP concept and calculation methods can be found in Hoekstra and Chapagain (2007a).

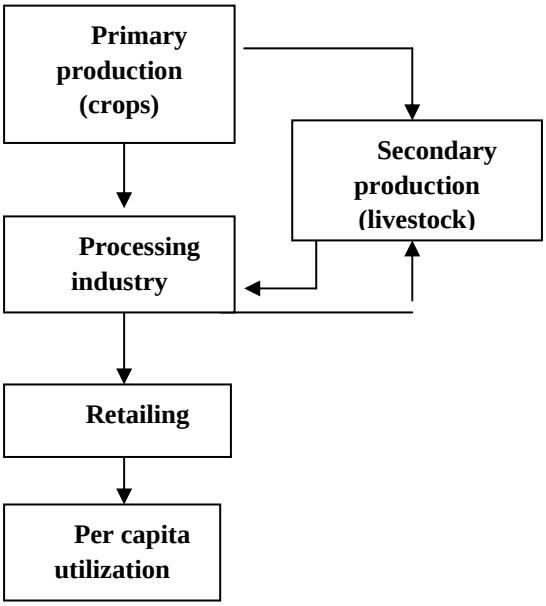

Figure 1. Simplified overview of the production-consumption chain. A production-consumption system consists of agricultural production made up of primary and secondary production that provide crop and animal commodities, industry that uses the output from primary and secondary production to manufacture items for consumption, retailing, and final utilization. Physical streams flow from agriculture to the processing industry, retailing, and individuals. Sometimes, streams flow in the opposite direction. These opposite streams concern waste streams that are reused in an earlier stage of production. Between the links of the chain trade flows occur, often on a global scale.

The water footprint of a nation can be assessed through a bottom-up or top-down approach (Hoekstra and Chapagain, 2008). In the bottom-up approach, the water footprint of a nation is calculated by multiplying all goods and services consumed by the inhabitants of a country by the respective water needs for those goods and services. This method has been applied in a study for China (Ma et al., 2005). In the top-down approach, the water footprint of a country is calculated as the total water use in the country plus the incoming virtual-water flow minus the virtual water export from the country. This method has been applied in various papers, including for instance Hoekstra and Chapagain (2007a, 2007b). The current study adopts the bottom-up approach in assessing the water footprint of the Netherlands and unlike previous studies applies global average estimates of the virtual water content of products.

2.3 Methods and data

2.3.1 Dutch per capita utilization

Information on Dutch per capita utilization, i.e. net amounts of commodities available per capita per year, can be obtained from the FAO food balance

sheets. That database also provides information on import and export streams. For commodities from livestock production systems, however, large inputs are needed in the form of feed. Figure 2 gives an overview of feed and livestock product streams. It shows that livestock products for Dutch consumers, i.e. meat, milk and eggs, are either produced in Dutch secondary production systems or in foreign systems. Feed consists of a large variety of different ingredients, sometimes derived from primary production systems, for example, grass or soyabeans; sometimes wastes from the processing industry, for example, citrus pulp. The figure shows that these ingredients can be imported from all over the world. The FAO provides data on per capita utilization of commodities for food but not on all inputs for feed. This means that for feed ingredients the country of origin is not always known. This study assessed average per capita utilization of commodities derived from primary and secondary production systems over the years 1997-2001. It obtained data from the FAO food balance sheets (FAO, 2007). One of the objectives of the study was to identify the commodities that contribute most to the external Dutch WFP. Therefore, the study also took feed commodities for livestock into account. Data on livestock feed were derived from Gerbens-Leenes (1999).

2.3.2 The water footprint of the Netherlands

For the assessment of the water footprint of the Netherlands, the study combined data on average Dutch utilization (kg per capita per year) over the period 1997-2001 from the FAO (2007) with data on average global virtual water contents of commodities from Chapagain and Hoekstra (2004). For cotton, it derived data from Chapagain et al. (2006). The study made a distinction between the external and internal water footprint. This was done according to the ratio of import and internal production. The Netherlands is a country with a large food industry which is important for the national economy. Therefore, in addition to the external WFP related to utilization, the study also assessed the average WFP related to imports for the period 1997-2001.

2.3.3 Commodities with a large external water footprint

Some commodities from primary production systems have a relatively large contribution to the total external water footprint of the Netherlands. For the six most relevant commodities, we analyzed trade flows in terms of volume and virtual water content showing the most important countries of origin. For countries that only form a trade link between the producing and consuming country, we analyzed the origins of the traded commodities. Data on trade were obtained from the PC-TAS database (ITC, 2004). For cotton, a commodity grown in a large number of countries, we also analyzed the main cotton producing countries as well as their national utilization. The impact of production in the exporting country was analyzed by comparing information on the regions where production takes place from the USDA (2007) with information from the WWF (2007) on ecoregions. To find the companies that have an important role in import, we performed a literature search.

2.3.4 Sugar and beer

Sugar and beer are two foods that are often associated with an affluent consumption pattern. Sugar is manufactured from sugar beets or sugarcane, while barley is the main ingredient for beer (Catsberg and Kempen-van

Dommelen, 1997). In the Netherlands in 1950, average per capita utilization of sugar was 35 kg per year. Utilization gradually increased over the period 1950-2001 to 46 kg per year. For beer, the increase was substantial, a ninefold increase from 11 liters per capita per year in 1950 to 96 liters in 2001 (FAO, 2007). The dominant place of these two foods in the Dutch consumption pattern forms the main reason that we analyzed the WFP of sugar and beer.

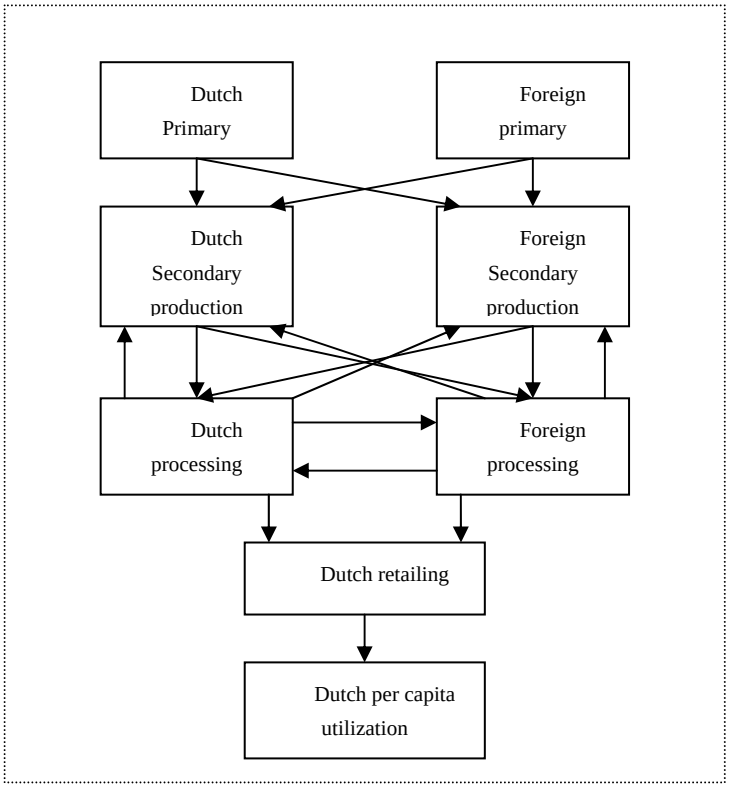

Figure 2: Overview of feed and livestock product streams. Livestock products for Dutch consumers, i.e. meat, milk and eggs, are either produced in Dutch secondary production systems or in foreign systems. Feed consists of a large variety of different ingredients, sometimes derived from primary production systems, for example, grass or soyabeans; sometimes wastes from the processing industry, for example, citrus pulp. The figure shows that these ingredients can be imported from all over the world

2.3.5 Cut flowers

Flowers are an important product for the Dutch national market as well as for export. In 2006, the Dutch trade of cut flowers was 2500 milion Euro (Bloemenveiling Aalsmeer, 2006). Based on the annual report of the Bloemenveiling Aalsmeer (2006), the study made an assumption of Dutch national utilization of flowers. This was done by subtracting export from total trade. For flowers, the study did not make an assessment of the virtual water footprint because data on virtual water contents are not available yet. However, the study did make an inventory of the main exporting countries of flowers to the Netherlands.

3 Results and discussion

3.1 The Dutch Water Footprint

Table 1 shows the results for the average per capita water footprint (WFP) over the period 1997-2001. More than half of all water, i.e. 55% of the total WFP, is needed for livestock products (milk, pig meat, bovine meat, eggs, poultry meat and butter). Dairy cows produce milk as well as bovine meat, while meat cattle produces high quality beef. Dutch cattle is mainly fed with roughage (for example, grass and hay) and some additional feed mainly composed of waste streams from the Dutch food processing industry (Gerbens-Leenes, 1999). The primary production systems for cattle, therefore, are pastures that find themselves in the Netherlands. Dutch pigs and poultry are fed with crops and wastes from the food processing industry. The main crops for pig and poultry feed are cassava, soya and maize. These crops are not grown in the Netherlands itself. The waste streams for pig and poultry feed are, for example, oil cakes, wastes from the sugar processing industry, or citrus pulp. The Dutch food processing industry generates large waste streams for feed, but the feed industry also imports large quantities of waste streams (Gerbens-Leenes, 1999). The primary production systems for pigs and poultry, therefore, find themselves in the Netherlands and abroad. This means that the WFP for milk and bovine meat is mainly an internal WFP, while the WFP for pig meat, poultry meat and eggs is partly internal and external.

Coffee and cotton are commodities of vegetal origin with relatively large contributions to the total WFP, 9 and 8% of the total respectively. The affluent foods sugar and beer use relatively large amounts of water, even more water than foods that form the major part of a meal, such as potatoes and vegetables.

Table 1: Average Dutch per capita water footprint (WFP) over the period 1997-2001

Commodity	Total Dutch WFP (m^3 per capita per year)	% of total WFP
Milk	356.6	19.1
Pigmeat	297.6	16.0
Bovine meat (including bone)	210.4	11.3
Coffee	158.4	8.5
Cotton	144.5	7.7
Wheat	83.3	4.5
Cocoa beans	61.9	3.3
Eggs	56.9	3.1
Poultry meat	49.5	2.7
Sugar	37.0	2.0
Treenuts	33.2	1.8
Beer	28.9	1.5
Tea	28.3	1.5
Butter	28.3	1.5
Groundnut oil	24.4	1.3
Vegetables	24.3	1.3
Fruits other	22.7	1.2
Potatoes	22.2	1.2

Other meat	21.9	1.2
Apples	21.4	1.1
Oranges	19.7	1.1
Soyabean oil	17.7	0.9
Palm oil	15.2	0.8
Wine	11.9	0.6
Rice	11.3	0.6
Sunflowerseed oil	8.8	0.5
Grapes	7.4	0.4
Olive oil	7.2	0.4
Coconut oil	6.9	0.4
Mutton and goat meat	6.1	0.3
Coconuts	5.8	0.3
Tobacco	4.2	0.2
Rape and mustardoil	3.9	0.2
Bananas	3.0	0.2
Groundnuts	2.8	0.2
Maize	2.6	0.1
Oats	2.5	0.1
Rye	2.2	0.1
Peas	2.1	0.1
Beans	2.0	0.1
Grapefruit	1.8	0.1
Barley	1.6	0.1
Olives	1.5	0.1
Maize germ oil	1.4	0.1
Palmkernel oil	1.3	0.1
Rape and mustardseed	1.0	0.1
Lemons	0.6	0.0
Pineapples	0.6	0.0
Soyabeans	0.5	0.0
Dates	0.2	0.0
Total	**1865.5**	**100**
Main feed ingredients for pigs and poultry		
Cassava for feed	97.6	5.2
Maize for feed	23.5	1.3
Soya for feed	78.2	4.2

3.2 Commodities with large contribution to the Dutch external water footprint

Results calculated in this study provide an indication of the commodities that have the largest impact on the total as well as the external WFP. Table 2 shows the commodities with a relatively large contribution to the Dutch external per capita WFP over the period 1997-2001. It covers about half of the total WFP. It is stressed that for pig and poultry meat and for eggs, calculations were based on global average numbers for virtual water contents that do not make a distinction between internal and external WFP for feed components. For the main ingredients for feed - cassava, maize and soya -

the study calculated the WFP. Feed consists of a large variety of ingredients. For many of these ingredients, virtual water contents and countries of origin were unknown. Therefore, the study did not make a distinction between the internal and external part of the total WFP, and only provides data on the commodities with a large contribution to the external WFP.

Table 2 shows that almost 160 m3 of water per capita per year is related to the utilization of coffee, and 145 m3 to the utilization of cotton. Cassava and soya, together contribute 180 m3 to the external Dutch WFP. In this way, the utilization of pork, poultry and eggs has a substantial impact on the external Dutch WFP. Wheat and cocoa beans contribute 64 and 62 m3 to the external WFP respectively. Table 2 further shows that only six commodities are responsible for 70% of the external WFP, while there is a large range of imported commodities that only have a small contribution to the external WFP.

Based on global average virtual water contents, the average WFP of the Netherlands over the years 1997-2001 was 1865 m3 per capita per year. Of this total WFP, the study identified imported commodities that contribute to half of the total WFP, which means that at least 50% of the WFP finds itself outside the national borders. It is stressed that virtual water contents for the same crops differ among countries and depend among other things on climate and agricultural practice. If actual virtual water contents of crops per country of production were used as input, results would have been different. The Netherlands is a country with relatively high yields, which results in relatively low values for the virtual water content of crops. Calculations based on actual virtual water contents, therefore, would probably have shown a smaller internal WFP.

3.3 Dutch water footprint related to imports

Table 3 shows the results for the average per capita water footprint related to imports over the period 1997-2001. It shows that almost half of the Dutch WFP for imports is related to soya and cocoa beans. When results of Table 2 and 3 are compared, the important role of the Dutch food industry becomes evident. Soya, an important livestock feed, is used for the production of livestock products, an important Dutch export product. For cocoa beans, the WFP related to import is an order of magnitude larger than the WFP for Dutch utilization, again showing the importance of industry and export. The Table shows that there is a large range of imported commodities that only have a small contribution to the WFP related to import.

3.4 The water footprint of sugar and beer utilization

The main ingredient for sugar consumed in the Netherlands is sugar beet, to a large extent grown in the country itself. Over the period 1997-2001, the Netherlands produced an annual amount of sugar of 1000 106 kg, whereas it imported only 100 106 kg (FAO, 2007). The WFP related to the utilization of sugar, therefore, mostly contributes to the internal Dutch WFP. Although its contribution is small compared to livestock products, the contribution of 34 m3 per capita per year is the largest Dutch contribution in the category of commodities of vegetal origin. The main ingredient for beer is barley. Between 1997 and 2001, the Netherlands on average produced 300 106 kg barley and imported 1000 106 kg. Based on an average utilization of 96 liters of beer per capita per year, the internal WFP is about 7.1 m3 and the

external WFP 21.8 m3 per capita per year. Over the period 1997-2001, the Netherlands imported 45% of the barley from France and another 41% from Germany.

Table 2: Commodities with a relatively large contribution to the average external Dutch per capita water footprint over the period 1997-2001

Commodity	Contribution to external Dutch WFP (m^3 per capita per year)
Coffee	158.4
Cotton	144.5
Cassava	97.6
Soya	80.9
Wheat	63.7
Cocoa beans	61.9
Treenuts	33.2
Tea	28.3
Groundnut oil	24.4
Beer	21.8
Oranges	19.7
Fruits other	18.1
Maize (crop and oil)	16.3
Palm oil	15.2
Wine	11.9
Rice	11.3
Apples	10.5
Sunflowerseed oil	8.8
Grapes	7.4
Olive oil	7.2
Coconut oil	6.9
Vegetables	6.6
Coconuts	5.8
Tobacco	4.2
Rape and mustard oil	3.9
Potatoes	3.7
Sugar	3.4
Bananas	3.0
Groundnuts	2.8
Peas	2.0
Oats	2.0
Rye	1.9
Beans	1.9
Grapefruits	1.8
Olives	1.5
Palmkernel oil	1.3
Barley	1.2
Rape and mustard seed	1.0
Lemons	0.6
Pineapples	0.6
Dates	0.2
Total	897.4

Table 3: Average per capita Dutch water footprint related to import over the period 1997-2001

Commodity	Dutch WFP related to import (m^3 per capita per year)	Dutch WFP related to import %
Soya (beans and oil)	1221.6	25.6
Cocoa beans	970.4	20.3
Milk	315.7	6.6
Wheat	283.7	5.9
Palm oil	255.5	5.3
Coffee	189.7	4.0
Maize (crop and oil)	171.2	3.6
Cotton	144.5	3.0
Bovine meat	125.9	2.6
Cassave	90.1	1.9
Barley	88.1	1.8
Sunflower seed oil	87.4	1.8
Butter	68.2	1.4
Rape and mustard oil	61.4	1.3
Treenuts	54.7	1.1
Oranges	52.4	1.1
Fruits other	51.9	1.1
Rape and mustard seed	45.3	0.9
Tea	44.6	0.9
Groundnuts	44.3	0.9
Coconut oil	39.6	0.8
Poultry meat	37.5	0.8
Pig meat	36.1	0.8
Other meat	32.8	0.7
Rice	31.2	0.7
Peas	25	0.5
Potatoes	24.3	0.5
Vegetables	22.9	0.5
Apples	17.8	0.4
Beans	17.2	0.4
Coconuts	13.4	0.3
Wine	13.0	0.3
Groundnut oil	12.5	0.3
Grapes	12.3	0.3
Eggs	12.3	0.3
Grapefruit	8.5	0.2
Olive oil	8.2	0.2
Bananas	7.9	0.2
Rye	7.5	0.2
Sugar	5.5	0.1
Oats	4.4	0.1
Tobacco	4.2	0.1
Palmkernel oil	4.0	0.1
Lemons	3.2	0.1
Pineapples	3.0	0.1
Beer	2.7	0.1
Mutton and goat meat	2.7	0.1

Olives	1.8	0.0
Dates	0.3	0.0
Total	4778.4	100.0

3.5 Countries of origin for the main imported commodities

3.5.1 Coffee

Table 4 shows the six most important countries that export coffee, directly or indirectly, to the Netherlands. Brazil and Colombia are the main exporting countries to the Netherlands, Uganda, Vietnam and Guatemala have relatively small exports, while the other half of the Dutch imports comes from a large variety of countries. In Brazil, coffee production is concentrated in Minas Gerais where 50% of the Brazilian coffee is grown.

Table 4: Six most important countries that export coffee, directly or indirectly, to the Netherlands

Country of origin	Contribution to Dutch coffee utilization (%)
Brazil	16.6
Colombia	13.0
Uganda	7.5
Vietnam	7.3
Guatemala	6.3
Mexico	4.4

Source: ITC, 2004

The coffee producing countries export about 95% of the coffee in the form of green coffee, i.e. non-roasted. Five large multinational companies dominate the international trade of coffee: Neumann Kaffee Gruppe (Germany), Decotrade (Switzerland) for Sara Lee/Douwe Egberts and Taloca for Phillip Morris/Kraft. The five largest, internationally operating coffee manufacturers that dominate about 50% of the global market are Nestlé, Phillip Morris/Kraft, Sara Lee/Douwe Egberts, Proctor & Gamble en Tschibo (Koffiecoalitie, 2007).

3.5.2 Cotton

Table 5 shows the main exporting countries of cotton to the Netherlands over the period 1997-2001. It shows all exporting countries, either directly or indirectly, including trading countries. For Germany, a non cotton producing country with large export to the Netherlands, the origin of exporting countries have been traced back, so that imports from Germany are not shown under Germany but under the original exporting countries. Cotton comes from all over the world, while a large number of non cotton producing countries are involved in trade, for example, the United Kingdom that does not grow cotton itself.

It can be argued that in the case of cotton, there is a large world market, so that cotton consumed in the Netherlands is probably a reflection of the availability worldwide. In other words, the origin of Dutch cotton utilization is probably reflecting the ratio of the share of cotton producing countries to world trade. Table 6 shows the main cotton producing countries, their national utilization and their export to the world market. The table shows that the largest cotton producing countries not necessarily have the largest

exports. China, for example, is by far the largest producer, but also the largest consumer, causing a net import flow. The USA, India, Pakistan and Turkey also produce large amounts of cotton but are also large consumers.

Table 7 shows the largest, globally active, cotton traders, the country of origin, the type of company as well as an indication of the magnitude of the volume of trade. Data were derived from De Man (2001).

3.5.3 Cassava, maize, cocoa and wheat

The import of cassava is dominated by only one country: Thailand. 88% of the total import of cassava originates from that country. The Netherlands imported maize mainly from France (77%) and soya from Brazil (41%) and the USA (34%). It imported cocoa beans mainly from Côte d'Ivoire (50% of the total) and wheat from France (50% of the total).

3.5.4 Cut flowers

Based on rough assumptions, the per capita utilization of cut flowers in the Netherlands in 2006 was 6 kg. About one third of the available flowers is imported, mainly from Kenia (54%), Israël (18%), Ethiopia (8%), Oeganda (8%), Zimbabwe (4%), Ecuador (2%), Zambia (2%), Tanzania (2%), Spain (2%) and South Africa (1%).

Table 5: Main exporting countries of cotton to the Netherlands

Country of origin	Main exports to the Netherlands between 1997-2001 (tons)
Turkey	21174
Russian federation	7777
USA	7408
India	7249
Pakistan	7001
Indonesia	6438
France	5857
Uzbekistan	5841
Thailand	5161
Italy	5068
Greece	4352
Taiwan	3415
Czech republic	3358
United Kingdom	2701
Spain	2400
Latvia	2141
Moldova	1922
Malaysia	1832
China	1407
Portugal	1300
Sweden	1197
Egypt	1055
Switzerland	1007
USA,PR,USVI	976

Chad	814
Zambia	762
Sudan	694
Korea	614
Zimbabwe	410
Syria	346
Lithuania	339
Tajikistan	312
Estonia	308
Mozambique	278
Brazil	275
Argentina	233
Turkmenistan	231
United Arab Em.	228
Israel	228
Mali	215
Cameroon	215
Sri Lanka	200
Kazachstan	169
Tunesia	156
Burkina Faso	150
Ireland	138
Benin	126
S. Afr. Cus.Un.	93
Denmark	74
Cent.Af.Rep	70
South Africa	66
Slovakia	60
El Salvadore	60
Côte d'Ivoire	51
Kyrgyzistan	45
Paraguay	43
Iran	39
Togo	33
Nigeria	24
Guinea	24
Azerbaijan	20
Senegal	18
Afghanistan	16
Hungary	14

Source: ITC, 2004

Table 6: Main cotton producing countries, their national utilization and their export to the world market

Country	Cotton production 1998-1999 (1000 tons)	Cotton utilization 1998-1999 (1000 tons)	Cotton for the world market (1000 tons)
Uzbekistan	1000	125	875
Australia	758	40	718
India	2830	2300	530
Greece	360	125	235
Argentina	325	95	230
Mali	210	2	208
Burkina Faso	168	2	166
Turkmenistan	200	45	155
Benin	155	2	153
Côte d'Ivoire	140	30	110
Tajikistan	120	18	102
Zimbabwe	130	38	92
Kazakhstan	55	4	51
Pakistan	1600	1550	50
Egypt	232	240	-8
Spain	95	122	-27
Turkey	1340	1370	-30
Russia	1	175	-174
Mexico	223	490	-267
Thailand	21	320	-299
Brazil	400	700	-300
Indonesia	4	460	-456
China	4100	4600	-500

Source: De Man, 2001

Table 7: Largest, globally active, cotton traders, the country of origin, the type of company as well as an indication of the magnitude of the volume of trade (*Source: De Man, 2001)*

Trader	Country	Type	Volume 1994*	Nr on list 2000
Allenberg & Dreyfus	USA	Private	XL	1
Hohenberg & Ralli	USA	Private	XL	2
Dunavant	USA	Private	XL	3
Staple Cotton Cooperative Association	USA	Cooperative	L	4
Plains Cotton Cooperative Association	USA	Cooperative	L	5
Uzagroimpex	Uzbekistan	Government	XL	6

Reinhart	Switzerland	Private	XL	7
Calcot Ltd.	USA	Cooperative	XL	8
Queensland Cotton Cooperation Ltd.	Australia	Private	L	9
Weil-Brothers-Cotton Inc.	USA	Private	L	10
COPACO	France	Private	XL	11
Namoi Cotton Cooperative Ltd.	Australia	Cooperative	L	12
Aiglon Ltd.	Switzerland	Private		13
Ecom USA	USA	Private		14
Colly Cotton Australia	Australia	Private	L	15
Plexus Cotton	UK	Private		16
Cotton Marketing Organization	Syria	Government	L	17
Toyo Cotton Co	Japan	Private	L	18
Chinatex	China	Government	XL	19
The Cotton Corporation of India Ltd.	India	Government	XL	20
Toyoshima & Co	Japan	Private		21
Albrecht, Muller-Pearse & Co	Germany	Private		22
Société d'Importation et de Commission	France	Private	L	23
Baumann Hinde	UK	Private		24
Volcot US	USA	Private		25
Cotton Export Corporation	Pakistan	Government	L	
SONAPRA	Benin	Government	L	
Conticotton	USA	Private	XL	
Stahel	Switzerland	Private	XL	
Agro-Plus K&M AG	Switzerland	Private		
Volkart	Switzerland	Private	M	
Meredith Jones	UK	Private		
Boswell	USA	Private	L	

* XL = > 200 * 10^3 tons

X = between 50 and 200 * 10^3 tons

M= between 15 and 50 * 10^3 tons

4 Conclusions

The average total per capita Dutch WFP over the period 1997-2001 was 1865 m^3, of which at least half is external. The WFP was dominated by foods of animal origin, milk, meat and eggs. Cattle, producing milk and bovine meat, were related to the largest contribution to the total WFP. Milk, requiring one fifth of all water, was the food that showed the largest contribution to the WFP, and bovine meat 11%. Pig meat was the second largest contributor to the Dutch WFP, 16%. Eggs and poultry contribute to 6% of the Dutch WFP.

The external WFP was dominated by only six commodities, (i) coffee (158 m3 per capita per year),

(ii) cotton (145 m^3 per capita per year), (iii) cassava (98 m^3 per capita per year), (iv) soya (81 m^3 per capita per year), (v) wheat (64 m^3 per capita per year) and (vi) cocoa beans (62 m^3 per capita per year). The main country of origin of coffee is Brazil, where 17% of the coffee consumed in the Netherlands originates. In Brazil, coffee production is concentrated in Minas Gerais, where half of the Brazilian coffee production takes place. Only three multinationals dominate the coffee market: (i) Neumann Kaffee Gruppe (Germany), (ii) Decotrade (Switzerland) for Sara Lee/Douwe Egberts and (iii) Taloca for Phillip Morris/Kraft. The five largest, internationally operating coffee manufacturers that dominate about 50% of the global market are Nestlé, Phillip Morris/Kraft, Sara Lee/Douwe Egberts, Proctor & Gamble en Tschibo.

Cotton comes from all over the world. The Netherlands imports large quantities of cotton from Turkey, the Russian federation, the USA, India, Pakistan, Indonesia, France, Uzbekistan, Thailand and Italy. But not only cotton is imported, the Netherlands also imports cotton in the form of clothing etc. The main cotton producing countries that show productions for the world market larger than 100 10^6 kg per year are Uzbekistan, Australia, India, Greece, Argentina, Mali, Burkina Faso, Benin, Côte d'Ivoire, and Tajikistan. Although a country like Turkey shows large export of cotton to the Netherlands, it has to import cotton itself for its national market. The world cotton market is dominated by about thirty companies, especially from the USA, Australia, Switzerland, Uzbekistan, France, the UK, Syria, China, India, Germany, Pakistan, Benin, and Japan.

Cassava is mainly derived from Thailand, soya from Brazil and the USA, cocoa beans from Côte d'Ivoire and wheat from France. The utilization of cut flowers is relatively small, about 6 kg per capita per year. Cut flowers more and more come from other countries. In 2006, one third was imported. Half of the import came from Kenia, one fifth from Israël, the other 30% from Ethiopia, Oeganda, Zimbabwe, Ecuador, Zambia, Tanzania, Spain, and South Africa.

Although the study was explorative in nature, using rough estimates and global average data on virtual water contents, it shows the main commodities that dominate the Dutch WFP, the countries of origin of these commodities, and, for coffee and cotton, the companies that dominate trade.

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Chapter 23 Environmental benefits and disadvantages of economic specialisation within global markets, and implications for SCP monitoring

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1 Introduction

The UK's progress in reducing emissions of climate change gases came under scrutiny in a recent independent UK report '*Too Good to be True? The UK's Climate Change Record'* (Helm et al., 2007). When measured using reporting methods prescribed by the UNFCCC, the UK has already achieved reductions well beyond its Kyoto obligations: greenhouse gas (GHG) emissions were 15% lower than 1990 levels by 2005. However, the UNFCCC approach includes only direct emissions of GHG gases taking place within national borders i.e. emissions related to UK production facilities, agriculture and direct emissions from households and government.

The authors of the report argue that much of the reduction has been achieved through a shift in the national economy's production mix towards lighter industry and services which, however, doesn't reflect any similar change in consumption patterns. Rather, the same products are being consumed but the UK is increasingly importing the more pressure-intensive of these. In other words it is 'outsourcing' the more pressure intensive extraction and production processes to China and other developing countries. If all the GHG emissions associated with the life cycle of goods which are consumed in the UK were added up and monitored over time, the authors estimate that this would show an *increase* in UK-driven GHG emissions by 19% between 1990 and 2006.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

Similar calculations have also recently been made for Sweden (Carlsson-Kanyama et al., 2007) and Norway (Peters and Hertwich, 2006). Such work raises questions over the methods by which we measure and report on national environmental pressures or, in other words, which pressures we take responsibility for as nation states.

Two different monitoring perspectives are effectively compared in the UK report. The first is one where countries take responsibility only for direct emissions within their borders from all national production of goods and services, and from private households. For the remainder of this paper we term this the '*production perspective'* though it can also be described as the territorial perspective. The second perspective is that of environmental pressures activated by national consumption. This includes pressures emitted abroad to produce imports for consumption but omits pressures emitted at home to produce goods for export. We term this the '*consumption perspective'*. The UK study found that GHG emissions activated by national consumption are significantly higher than direct emissions under the production perspective. The Swedish study had mixed results depending on assumptions made about production processes in other countries. This is described in more detail later.

The monitoring of national environmental pressures has a long history in Europe and is a key element in the environmental policy cycle. In addition to a number of international conventions and EU Directives which require regular reporting of emissions and other pressures, individual countries have also initiated there own monitoring mechanisms often connected to environmental indicators. Recently this has included the adoption of indicators on sustainable consumption and production (SCP) in a number of EU countries (EEA, 2007).

However, most if not all of the respective indicators and monitoring mechanisms have taken the production perspective similar to that of the UNFCCC i.e. only including direct territorial emissions. The reasons for this have changed over time.

Before the emergence of SCP as a policy issue during the 1990s, the focus of environmental policy was on end-of-pipe solutions, i.e. regulation of national production processes. Governments felt little if any responsibility for production processes occurring in other countries even if the resulting goods were being imported and consumed at home. These processes and the local environments they were affecting were clearly the responsibility of the producing country. Moreover, the share of imports and exports in national economies were significantly smaller than they are today. As such national production and national consumption could be regarded as more or less synonymous.

However, with growing international trade and increasing specialisation of countries in a handful of economic sectors, a country's production reflects to a diminishing extent the goods its population and government consume. Today, as illustrated by the UK report, pressures activated by national consumption can be quite different to those related to national production.

This, and the increasing recognition of the environment as a global rather than local issue have raised challenges to the traditional views of environmental responsibility.

The need for a paradigm shift has been particularly brought home by the unique challenge of climate change where 1 tonne of carbon dioxide emitted in China will have precisely the same long term effects on a European citizen as 1 tonne of CO_2 emitted at home.

Nevertheless, despite an increasing recognition that, as nations, we can and possibly should feel responsible for global pressures activated by national consumption, monitoring of environmental pressures and setting of targets for reductions in these pressures continues to be dominated by the production perspective i.e. focused on direct national emissions.

There are a number of reasons for this. Firstly, it is much easier for governments to regulate national production facilities than it is to influence production processes along global value chains. Secondly, the alternative means for regulating pressures activated by consumption – that of influencing which goods and services we actually consume nationally – has been, and still is, a political hot potato. Last, but not least, collection of data on pressures emitted along all stages of global production chains of nationally consumed products, has so far proved impractical if not impossible.

Input-output analysis of national economic and environmental accounts gives one possibility for estimating and comparing the environmental pressures activated under both perspectives for a given country. This paper reports on such a comparison for 8 European countries to investigate whether all European countries are actually 'outsourcing' their environmental impacts as has been reported for the UK, or whether some European countries are actually net 'importers' of environmental pressures.

It then discusses the findings in the context of sustainable consumption and production goals, identifying under which circumstances outsourcing of production can have negative implications and under which they have positive implications. Policy which works for and against environmentally beneficial economic specialisation is identified. Finally, implications for monitoring of progress in SCP are discussed

2 Brief Overview of the Methodology

2.1 Background

This paper draws on data and analysis generated by a multi-annual project carried out by the European Environment Agency's (EEA) European Topic Centre on Resource and Waste Management (ETC/RWM).

The project which first began in 2004 was aimed at investigating the potential of environmentally extended input/output analysis for analysing the environmental effects of European production and consumption.

The I/O method has many potential outputs and the project has explored a number of these. So far results have been published in an ETC/RWM technical report (Moll et al., 2006) but in June 2008 a full EEA report will be published covering some key outputs of the project so far (EEA, in press). This paper covers one application and area of analysis which will not be given focus in the EEA report.

The full methodology can be viewed in Moll et al. (2006). Some key aspects are given briefly below.

2.2 What exactly do we mean by the consumption and production perspectives?

Within a closed economy consumption and production are two sides of the same coin i.e. everything that is produced is eventually consumed. This is true of the global economy or of economies which don't engage in trade with other countries.

However, for an economy involved in international trade there can be a large difference between the products that the country produces and the products which are finally consumed both by private households and the government. Similarly there can be significant differences between the environmental pressures associated with a country's total production and the pressures associated with the products it consumes.

Here we term the first scenario as the *production perspective* (or alternatively the territorial perspective) and define this as all the *direct* environmental pressures occurring within the national borders or by companies registered within the country (see Figure 1). With respect to emissions to air this would include all emissions to air from national production facilities agriculture, transport services etc. irrespective of where they are supplying goods and services to (identified as black dots in Figure 1) plus all direct emissions from the end users i.e. households and government. Direct emissions from households will include those emitted by combustion of fuel mainly for heating and private cars.

The flip side of the coin is the *consumption perspective* (Figure 2). We define this as all environmental pressures activated directly or indirectly by national consumption. This only includes pressures from national production for the home market i.e. excludes pressures from production for the export market. It includes, however, pressures occurring in other countries to produce our imported goods. Finally, as with the production perspective it includes direct pressures arising in private households and government.

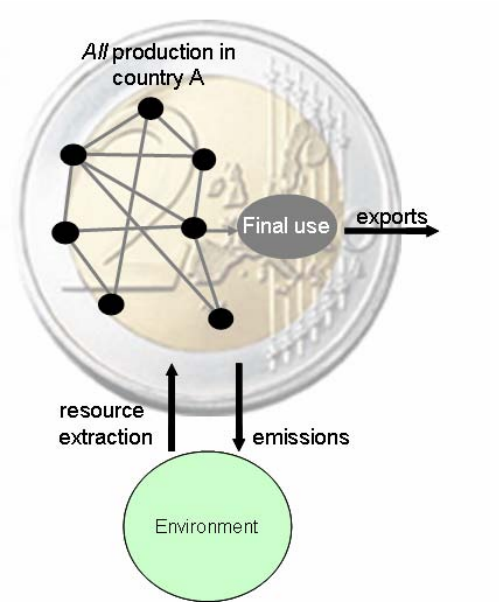


Figure 1: The production perspective for a given country

Another way of looking at the consumption perspective is that it includes all the pressures arising along the life cycle of goods and services finally consumed within the home country. Thus, while in the production perspective the individual production facility is in focus (black dots in Figure 1), under the consumption perspective it is the product itself that is the focus (illustrated by black flows between production branches in Figure 2)

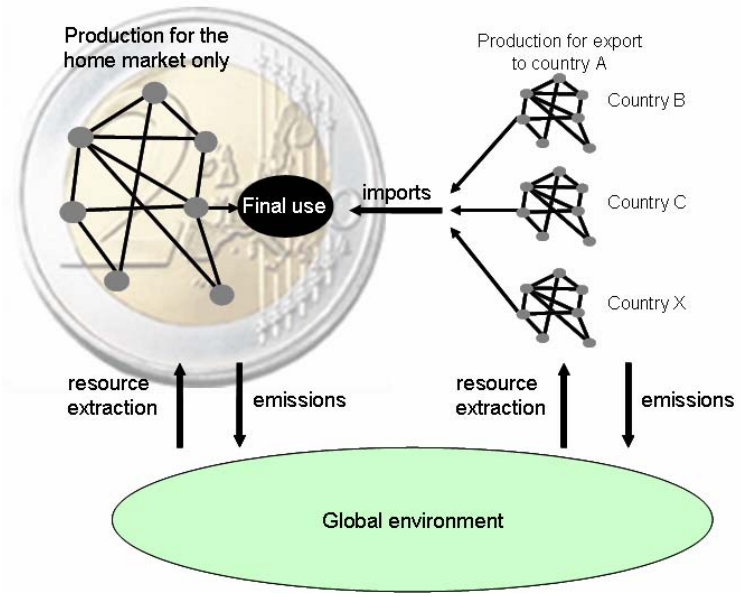


Figure 2: The consumption perspective for a given country

2.3 Environmentally extended input-output analysis

The analysis utilised a method known as *environmentally extended input-output analysis* (EE-IOA) for investigating the two perspectives. This method makes use of matrices which combine national economic accounts with environmental data. These are known as *national accounting matrices including environmental accounts* (NAMEA)

NAMEA matrices provide data on economic flows between economic branches within a country (i.e. the food processing industry, transportation equipment industry, banking and insurance etc.) and between these and final consumption groups (government, households, capital investments and exports). They also include monetary flows of imports for intermediate use and final consumption. In addition, the tables provide data on direct inputs and outputs to and from the environment, from each economic branch, and from households and government.

In their basic form NAMEAs present information related to the production perspective. They provide a picture of where exactly in the national economy resources are *directly* used and air emissions and other wastes directly generated. For the purposes of this paper total direct emissions and resource use within national borders can be obtained simply by summing contributions from each economic branch, and from households and government. The pressure-intensities of individual industries are calculated by dividing the total pressures they are responsible for by their economic output.

Considerably more effort is required to shift the perspective over to the consumption orientated view. Complex matrix transformations developed by Leontief (1970) and others are applied to the NAMEAs. Environmental pressures attributable to a given branch are re-allocated to the flows of goods and services it sells to other branches and eventually to the final consumer. The pressures are allocated in accordance with the monetary value of these flows. At the end of this process, the pressures allocated to a finally consumed product group are equivalent to the sum of all direct and indirect pressures accumulated along the full production-cycles of those goods. For the final use product group *food and beverages* it includes all pressures emitted in the production of food from the farm through to the supermarket shelf, including all inputs made along this journey. (e.g. pressures activated by the production and application of fertilisers, by the production and combustion of fuels in agricultural machinery, by the production of electricity consumed in food processing plants, fuel combusted during the transportation of all components through the production chain etc.).

We calculate the total pressures activated by national consumption by summing the pressures accumulated along all national product chains but excluding those chains ending in the export market. We must then add in direct pressures from households and government and the pressures accumulated along the global production chains of imported goods. This latter includes both final-use goods and inputs into national production chains e.g. imported fossil fuels, sub-components for machinery, pig-iron etc.

We may reach a point in the future where interlinked NAMEAs have been developed for all European countries and their key trade partners. For now, however, the EE-IO method can only make rough estimates of pressures accumulated by imported goods. This is done by assuming that industries abroad generate the same wastes and use the same resources per unit output as the same industries in the home country (what is actually being measured are avoided national emissions). Where goods are imported from developing and transition countries this assumption is likely to significantly underestimate their 'ecological rucksacks'.

2.4 The scope of the study

NAMEAs of the type necessary for transformation to the consumption perspective were developed for 8 EU countries: Denmark, Germany, Hungary, Italy, the Netherlands, Spain, Sweden and the UK. The tables disaggregated national economies into 60 separate economic branches (NACE 2-digits) plus the final use areas of private households, government, capital investments and exports. The latest available NAMEAs in the correct format were from 2000.

The number of environmental pressure variables available in the NAMEA tables varied by country. The UK NAMEA included 12 air pollutants, 9 heavy metals and 7 classes of material input while at the other end of the scale the Netherlands NAMEA included only 6 air pollutants, no heavy metals and 6 classes of material input. These were transformed into four main *impact potentials:* Global Warming Potential (measured in tonnes CO_2 equivalent); Acidification Potential (measured in tonnes SO2 equivalent); Tropospheric Ozone Forming Potential (measured in tonnes NMVOC equivalent) and Domestic Extraction Used including all material types.

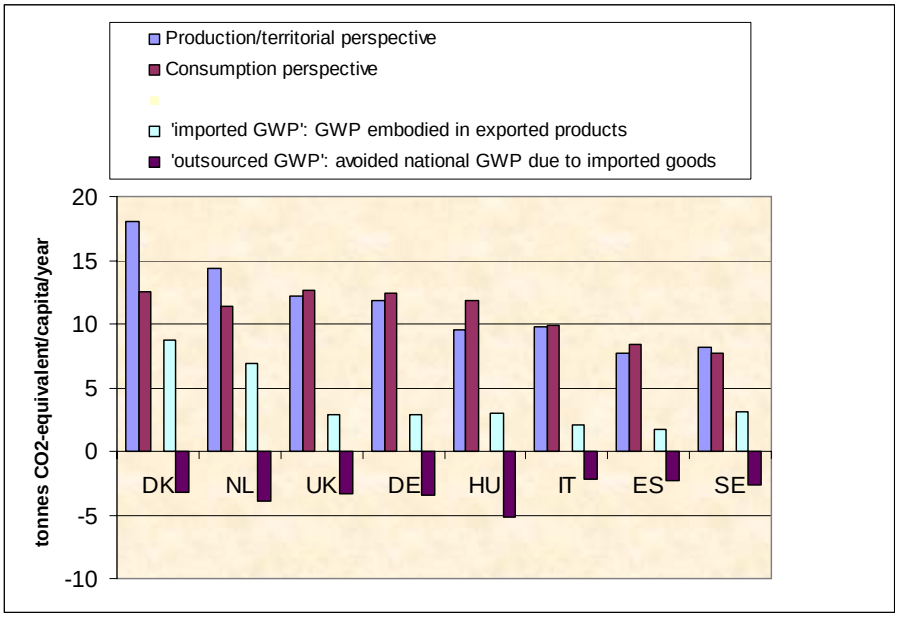
3 Not all European countries 'outsource' environmental pressures

Figures 3 and 4 compare the national global warming potential and total material extraction per capita from the production perspective and the consumption perspective, for the 8 EU countries (the two bars to the left for each country).

The difference between the two perspectives is entirely accounted for by something we term '*the burden exchange'*. This comprises on one side, the pressures emitted during the production of goods for export – which can loosely be described as 'imported pressures' – and on the other side, avoided pressures in the home country though the import of goods for consumption. This latter can be considered as a rough estimate of the pressures which are embodied in imported goods. We term these 'outsourced pressures'. Imported and outsourced pressures are illustrated in the right hand bars of Figures 3 and 4. Where the pressures embodied in imports are greater than those embodied in exports, the country shows a net 'outsourcing' of impacts.

In this case consumption-activated pressures are greater than direct territorial pressures.

Figure 3: Nationally-activated Global Warming Potential viewed from two



perspectives plus contributing burden exchange

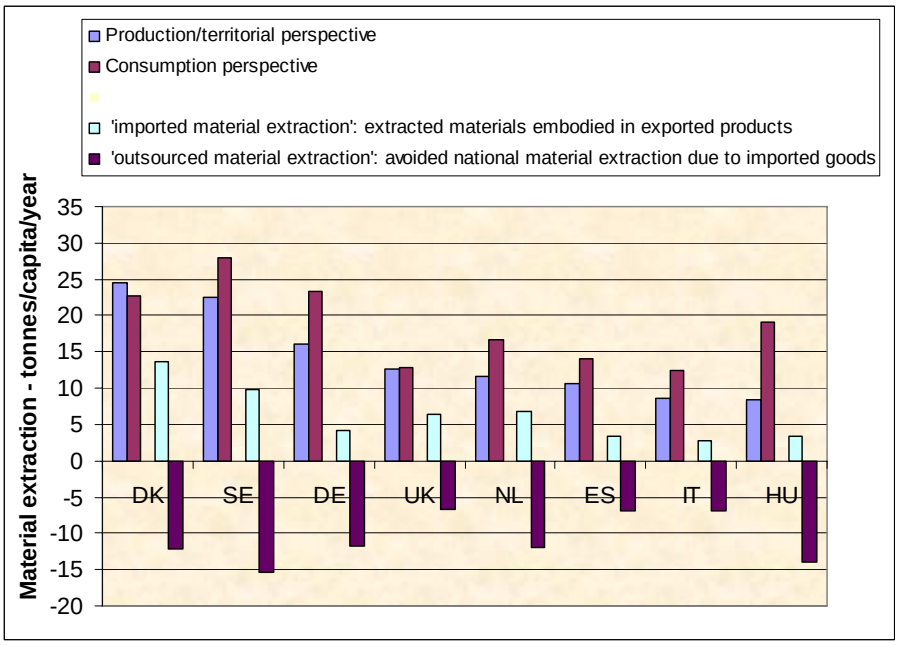


Figure 4: Nationally-activated material extraction viewed from two perspectives plus contributing burden exchange

A first observation is that pressures related to consumption are somewhat more consistent between countries than pressures related to production. This

is not surprising. Householders in OECD countries consume similar mixes of products and services, but the mix of goods a country produces differ widely as international trade increases and economies begin to specialise in certain economic branches.

A more surprising result is that the widely accepted argument among green thinkers, that Europeans outsource their dirty industries, and resulting environmental pressures to other parts of the globe may not be altogether correct.

For 6 out of 8 countries material consumption for use in national production is indeed considerably lower than total material consumption at home and abroad to feed national demand for goods. All countries except Denmark and the UK are outsourcing material extraction – mostly connected to outsourcing of extractive industries i.e. minerals and metals, fossil fuels, biomass etc.

However, for greenhouse gases, the picture is much more mixed. Differences between the two perspectives are fairly small for most countries. This is not because the burdens associated with traded goods are insignificant but rather that the estimated pressures embodied in imports and those embodied in exports largely cancel one another out. Only Hungary shows a marked tendency to outsource greenhouse gas emissions.

Meanwhile in Denmark and the Netherlands air emissions connected to national production activities are actually significantly higher than global air emissions activated by the country's demand for goods. In other words, these two countries are specialising in pressure intensive industries for the export market. The same trends were observed for the other air emission related impact potentials.

It should be noted here that the method used to estimate pressures embodied almost certainly represents a significant underestimate where those imports are coming from developing and transition countries. As discussed later, pressures per unit output of production processes in developing countries can be significantly higher than for the same process in EU countries. This will effect the balance of the burden exchange given in Figures 3 and 4 and may mean that in actual fact that Sweden and, depending on the scale of the underestimate, even the Netherlands and Denmark have a net shift of GHG emissions abroad. However the important point here is that, for those three countries at least, the net shifts are not occurring because the countries are outsourcing their 'dirtier' GHG-heavy industries. Rather if it is occurring, it is a result of production processes, both light and heavy, being generally less eco-efficient in developing countries than in the EU. This is an important distinction.

Returning to Figures 3 and 4, the greatest differences between the two perspectives appear to be occurring in the countries with smallest population. This may be because smaller countries tend to engage more in international trade and their economies can be dominated by a few large companies or branches specialising in the export market.

In Denmark the difference between the two perspectives is particularly high. While Danish citizens, through their consumption were responsible for around 12 tonnes of CO_2-equivalent per capita in 2000, the Danish economy was responsible for 16 tonnes (the final ~2 tonnes in the territorial perspective represented by direct emissions from households). The main cause of this difference is Danish specialisation in the pressure-intensive industries of container shipping and, to a lesser extent, meat production for export.

The gap between the two perspectives has widened even further over the intervening years since 2000, since the Danish shipping industry has grown more rapidly than the rest of the economy. Between 2000 and 2005 emissions of CO_2 from Danish shipping grew from 19 to 32 million tonnes i.e. from 3.5 to 6 tonnes per capita (Statistics Denmark, 2007). Recent figures released by AP Møller-Mærsk suggest that by 2007, CO_2 emissions from the Danish company's ships have increased further to 40-50 million tonnes by 2007, or approx. 8-10 tonnes per capita (Politiken, 2008).

The fact that these emissions, though nationally significant, are excluded from Kyoto obligations, has come under scrutiny in Denmark in recent months. Many have been calling for the UNFCCC rules to be changed to avoid such blind spots. However, a counter argument could be made: that specialisation in pressure-intensive economic branches could potentially be beneficial when viewed from a global perspective, but only if the company is carrying out those operations more eco-efficiently than other countries. Furthermore, that while impact-intensive branches should certainly be tackled under multinational agreement, including them in national inventories could work against beneficial specialisation and lead to 'pressure leakage' to other countries. This argument is presented and examined below.

4 Is production-specialisation environmentally beneficial or problematic?

Where consumption activated pressures differ markedly from territorial pressures, it is either because the national economy has specialised in low pressure-intensive branches (i.e. switched towards a service economy) or because it has specialised in industries with a higher than average pressure-intensity.

Specialisation by a national economy in a particular industry or economic branch can occur for a number of reasons. These can be summarised as follows:

- Availability of natural resources– this can include minerals, metal ores, as inputs to industrial production but also good soils, and good climatic conditions for agriculture etc.
- Cheap energy – this would give advantages to energy intensive industries compared to other countries
- Cheap labour – this gives particular advantages for labour intensive industries

- Technological innovation
- Historical trends – the original conditions for specialisation may no longer exist but specialisation may continue due to:
  a) accumulation of a specialist work forces;
  b) government grants and policies to protect an important national industry
  c) earlier investments having being paid off
  d) development of single large national company with increasingly improving economies of scale and improving efficiencies

Specialisation can also be reactive i.e. if heavy industry and manufacturing have been outsourced to other countries due to availability of resources and cheap labour respectively, the home economy may be forced to specialise in other branches, e.g. financial services etc.

Specialisation is likely to increase as global trade barriers are broken down, but is it good or bad for the environment?

4.1 Environmentally beneficial specialisation

Under certain conditions increasing specialisation can drive improving eco-efficiencies within the specialist branch. Examples can be where improving economies of scale lead to growths in energy efficiency within the specialist branch, as a result of continual reinvestment in new more efficient machinery, ongoing technological development etc. Vice versa, specialisation may actually be driven by higher eco-efficiencies and greater competitiveness due to favourable local conditions. For example, the climatic conditions in Italy and Spain favour vegetable and fruit crops which in northern European countries can only be grown in greenhouses with corresponding high energy inputs. Similarly, the availability of abundant hydro-energy in Norway is favourable for cheap and eco-efficient aluminium production.

Country specialisation in an environmentally-intensive industry branch may be perceived as negative when viewed at the national scale, leading to unfavourable comparisons with neighbouring countries (under the territorial perspective). However, if we take a global view, specialisation by a country in a ‘dirty’ branch may actually be giving overall environmental benefits.

Global environmental benefits from specialisation will only occur where:

1) specialisation is leading to or is a result of improving eco-efficiencies, and;
2) global environmental reductions in emissions resulting from specialisation more than outweigh resulting increases in transport emissions.

Condition 2 arises because country specialisation for the export market increases the need for international transport of goods. This condition has not been tested further in this paper. Condition 1 was however tested for the 6 countries with 2000 data as follows.

The NAMEAs of the 6 countries were viewed at the 60-branch level of resolution under the territorial perspective – in other words the 60 main economic branches which make up their economies. A combined NAMEA for the 6 countries was also assembled adding up the total economic output across the 6 countries within each economic branch, along with total environmental pressures for that branch.

Two factors were calculated for each branch at the country level:

1) *Eco-efficiency factor*: the eco-efficiency (pressure per unit of economic output) of that branch relative to the average eco-efficiency for that branch across the 6 countries as a whole – a value greater than zero denotes a better eco-efficiency; and
2) *Specialisation factor*: the level to which that branch is represented in the national economy relative to its importance at the 6 country level i.e. the degree to which the country specialises in that branch – a value greater than zero shows that the a branch is over-represented in the national economy

Figure 5 plots the two factors against each other for each of the 60 industries in the 5 countries which were part of the EU at the time i.e. 300 data points in all, with eco-efficiency expressed in terms of global warming potential. If specialisation were synonymous with improving eco-efficiency, the graph would show a scatter of industries from the bottom left hand corner (industry under-represented in country and having low relative eco-efficiency) up to the top right corner (industry over-represented in country and with high relative eco-efficiency).

The graph shows that, at least in 2000, the relationship does not hold. The central scatter of industries appears random. A number of industries at the extremes do show good accordance with the relationship i.e. specialisation is consistent with higher eco-efficiency and, vice versa, low eco-efficiency is consistent with under-representation of the industry in the national economy. Three key industries are working in particular against the general principal. These industries are worth considering in more detail and have been highlighted on the graph – the Swedish electricity industry, the Dutch chemicals industry and Danish shipping services.

The Swedish electricity industry shows higher eco-efficiency than its equivalent in other countries due to a high proportion of hydro-electric power along with some nuclear energy. Nevertheless, the industry is underrepresented in the Swedish economy: the country actually imports electricity from the rest of Scandinavia. In this particular case the potential for new hydroelectric capacity is limited by geographic conditions but an additional factor may be that new eco-efficient energy sources are not favoured economically. Increases in carbon tax costs may be necessary before eco-efficient electricity production is also economically advantageous (see later).

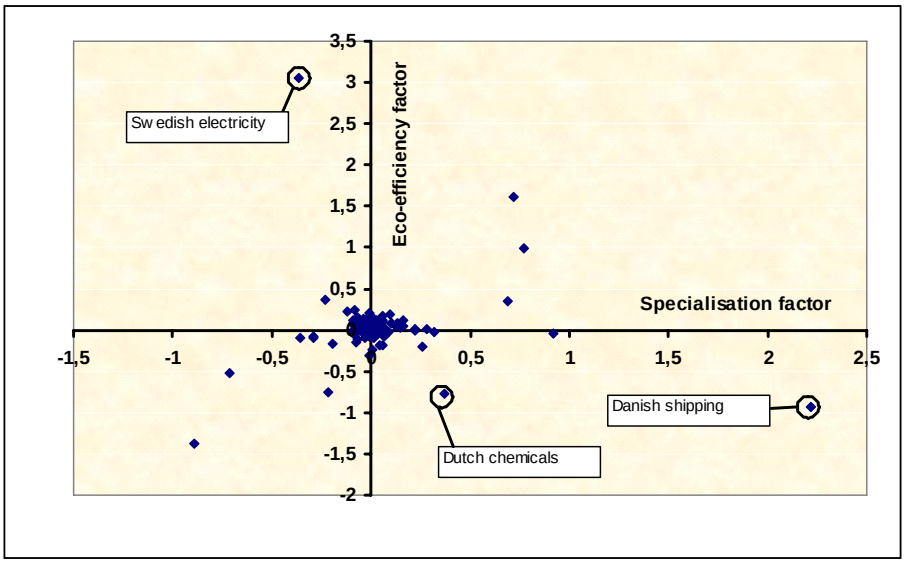


Figure 5: Specialisation (over-representation in economy) versus eco-efficiency (relative to same branch in other countries) for 60 economic branches in 5 countries (Denmark, Germany, Netherlands, Italy, Sweden)

The Dutch chemicals industry and Danish shipping industry show the opposite effect. They are over-represented in the economy but at the same time have lower eco-efficiencies than the same industry in other countries. There may be a variety of reasons for this. With respect to the Dutch chemicals industry, a relevant factor may be that the industry was exempt from carbon taxes during the end of the 1990s and beginning of the 2000s, unlike its counterparts in other countries such as Denmark and Germany (Kasa, 2000). The industry has since been encompassed by the EU emissions trading scheme although still enjoys some exemptions which can be exercised through the scheme.

The lower efficiency of the Danish shipping industry may partially reflect the fact that fuel for international shipping was in 2000 exempt from any form of environmental tax and remains exempt today. However, the sharp rise in basic fuel prices since 2000 means that even without additional taxes, fuel costs may now be acting as a driver towards improving efficiency and pushing towards specialisation with beneficial effects (fuel costs in 2007 represented approximately 50% of operational costs for freight shipping). It may take some years for these effects to be seen in the analysis applied in Figure 5.

Most industries in the 6th country, Hungary, do not follow the relationship if they are added into the graph. Of key relevance is the fact that in 2000 Hungary was not part of the EU with subsequent implications: firstly that trade between Hungary and the EU would not be free flowing with protection of industry on either side of the border, secondly that Hungarian industries would not be subject to similar environmental regulation and taxes as the EU countries, and thirdly that labour costs were significantly lower in Hungary than other countries. As described below beneficial specialisation is more likely to occur in regions with homogenous environmental regulation and taxes and similar labour costs.

4.2 Environmentally problematic specialisation

Branch specialisation can lead to an increase in global environmental pressures, where production is 'outsourced' to countries with lower eco-efficiencies than the home country.

Specialisation which can lead to environmental benefits as described earlier may most typically result from increasing distribution of production *within* the EU, although as shown by Figure 5 even here specialisation is occurring which works against environmental goals. Specialisation leading to *increasing* global environmental pressures is more typical of exchanges between EU and non-EU countries.

The latter is a case of reactive specialisation, where manufacturing, steel production, extraction and processing of metal ores, minerals and fossil fuels and other heavy industries in the EU have been increasingly unable to compete against similar industries in developing and transition countries. Products from these industries are increasingly imported from outside the EU and as a result many European economies have specialised more in services etc.

These industries in developing and transition countries are often out-competing their counterparts in the EU not because of greater efficiency but because of lower labour costs and access to raw material inputs. Even more relevant for this paper, lower environmental standards in these countries compared to the EU, can also reduce costs and increase competitiveness. As such, the drivers for specialisation in these cases are working *against* improved eco-efficiency rather than for them as may occur for redistribution of production within the EU.

As noted earlier, the input-output method used in the EEA and ETC/RWM's NAMEA project may significantly underestimate the pressures embodied in imports (Figure 3 and 4) by making the assumption that emissions per unit output (emissions coefficients) for a given industry abroad are the same as in the home country.

No assessment has been made in this project of the scale of these underestimates. The NAMEAs used do not hold information on where in the world imports originate. Nor do many of these countries have their own NAMEAs from which emissions coefficients could be drawn.

The potential scale of underestimates were hinted at in the project named earlier, which compared two different methods for estimating CO_2 emissions embodied in Swedish imports (Carlsson-Kanyama et al, 2007). The first method was similar to that used here making use of Swedish input/output tables, and Swedish emissions coefficients to estimate pressures embodied in imports (but in actual fact show emissions avoided at home due to imports) The second method used input/output tables and emissions coefficients from the Global Trade Analysis Project (GTAP). GTAP is a global database presenting rough exchanges of imports between 87 world regions and 57 economic branches within those regions. The database also contains

regionally varying emissions coefficients for some air emissions from the various sectors.

The two modelling exercises gave estimates of 26 MTon and 74 Mton respectively for CO_2 embodied in imports. In other words they differed by almost a factor of 3, largely because of differences in eco-efficiency of Swedish processes and those of its main trading partners (Carlsson-Kanyama *et al*. 2007). In particular, imports from the former Soviet Union and China were estimated to embody 7 times and 4.7 times the emissions as the same products produced in Sweden. However, it should be noted that, firstly, the GTAP database has been gathered from many sources over many different years and as such is likely to contain considerable errors (Peters, 2007) and, secondly, that eco-efficiency of Swedish product chains is particularly high for CO_2 emissions due to a significant proportion of electricity coming from renewables and nuclear sources. Therefore the GTAP comparison results for Sweden are likely to overestimate general differences between pressures associated with production chains in developing countries compared to those at home for the remaining 7 EU countries.

Nevertheless, importing raw materials, fuels and manufactured goods from transition and developing countries in Eastern Europe and Asia and resulting specialisation in lighter industries and services in the EU, is likely to lead to overall increases in global pressures.

Returning to the case where distribution of production within the EU may lead to global benefits, it should be mentioned that it can also lead to local environmental problems due to overloading of local natural resources. An example of this is in Denmark, France and Holland where regional specialisation in intensive pig production leads to problems with contamination and eutrophication of ground and/or surface waters (Jongbloed et al, 1999).

5 Policy working towards and against environmentally beneficial specialisation

It was identified earlier that some drivers of specialisation work towards global environmental benefits while others work against them. Similarly policy can be identified which strengthens or weakens these respective drivers.

Providing a level playing field is of key importance: any policy which acts towards harmonising polluter-pays costs across countries will lay a foundation for environmentally beneficial specialisation. Large differences in pollution costs between countries can encourage negative specialisation i.e. carbon intensive industry may relocate from a country with high carbon taxes to one with low taxes, reducing costs without the need to improve efficiency. This is termed as carbon leakage. Where pollution costs are harmonised, eco-efficiency can become a more important competitive variable in international markets.

However, a second necessary condition is that pollution and material costs must be high enough to give a real competitive advantage to eco-efficient processes and local conditions, and override other differences between countries such as differentials in labour costs.

Harmonisation of pollution regulation is a central element of the work of the EU Commission and DG Environment and has been progressed over the years through a variety of Directives. However, the costs of emissions still vary significantly between countries. The costs of carbon emissions are a case in point. While the Emissions Trading Scheme (ETS) to a limited extent harmonises carbon costs within countries for large emitters, there can still be significant cost differences between countries. A recent report for the EU Commission on energy costs and carbon taxes in 7 EU countries found that taxes for energy intensive companies varied by a factor of nearly 10 (Andersen et al, 2007). Harmonisation of taxes on a number of other pressures, for example NOx emissions or minerals extraction, is lagging even further behind.

Moreover, the same study found that carbon taxes remain a fairly insignificant cost factor for energy intensive companies. The nominal costs for carbon in the EU, lies at around 10-20 Euro per tonne. However due to the widespread use by countries of exemptions within the ETS, costs for large energy intensive companies typically lie at just 1-2 Euro per tonne, representing less than 2% of profits for most large emitters. Only in Sweden, the country most advanced in green tax reform, do carbon taxes represent over 3% of profits for some energy-intensive branches (Andersen et al, 2007).

The use of exemptions within the ETS is only one example of protectionism of important national industries which can work directly against beneficial distribution of production within the EU (such as was illustrated by the example of the chemical industry in the Netherlands earlier). Other examples are where governments protect nationally important companies through state subsidies or laying of tariffs on imports etc. The common agricultural policy (CAP) is an important example of a subsidy system which works against drivers for beneficial specialisation. In general removal of perverse subsidies and liberalisation of markets will be beneficial but only if supported by green tax reform and harmonisation of emissions costs.

There are examples within the EU of where green tax reform is already leading to potentially positive distribution of production. The Danish Energy Ministry has recently proposed to adjust carbon taxes for companies not covered by the ETS, to give similar costs per tonne as under the scheme. For some companies this will mean increases in carbon taxes per tonne by up to a factor of 50. One implication of this development is that it will no longer be economically viable to grow salads and vegetables in greenhouses in Denmark (Kronberg, 2008). In the future such products are likely to be increasingly imported from Spain and Italy. Since other studies have found that emissions associated with growing tomatoes in greenhouses in northern European countries are much higher than agricultural and transport

emissions associated with importing field-grown tomatoes from the Mediterranean, this is likely to give global environmental benefits.

With respect to this last point, transport fuel taxes also need to be harmonised with emissions costs for industry to ensure that environmental benefits of further distribution of production aren't outweighed by resulting environmental pressures from increasing transportation of goods.

Looking beyond regional borders, it is paradoxical that the green tax reform and tax harmonisation within the EU that is necessary for beneficial distribution of production within the EU, may at the same time lead to negative global environmental implications when trade with non-EU countries is taken into account.

Increasing and harmonised emissions costs in the EU will push energy intensive industries out of Europe to countries with lower environmental standards and lower emissions costs. According to the GTAP data, the same industries in developing and transition countries have comparably lower eco-efficiencies, added to which will come emissions from increasing transportation.

It is therefore imperative that at least the key exporting countries to the EU are encompassed by the post-Kyoto climate agreement. Until then there may be a case for imposing pressure related tariffs on imports from countries with no emissions taxes, at a rate similar to the taxes in the home country, as proposed by the French government in 2006 (ENDS, 2006a). This would require improved data on emissions coefficients for industry in other countries, and could only be justified if tax exemptions in the home country were removed. Moreover, such import tariffs may not be allowable under current WTO ruling (ENDS, 2006b).

6 Implications for monitoring progress in SCP

The discussions above have important implications for which pressures we monitor and take responsibility for as nation states. In theory we can feel responsible for direct territorial pressures arising from national production of goods and services and from households, or for direct and indirect global pressures activated by national consumption, or both. Essentially a choice between producer pays and consumer pays perspectives.

To date most focus has been on taking responsibility for national production for both domestic use and for export: economy-wide emissions inventories and monitoring schemes generally only consider the production (or territorial) perspective. This is because consumption side responsibility is both more difficult to measure but also more difficult to administer with a much greater number of actors and limited influence of a national government over production taking place in other countries.

As discussed, policy (and monitoring) focus on production can lead to increasing environmental pressures when looking from a global perspective by pushing heavy industry to areas with lower regulation and eco-efficiency.

Moreover, such environmental costs are not visible under current production-based monitoring which therefore can give 'false' positives for progress in decoupling.

At the other end of the scale, specialisation of an economy in an impact-intensive industry can potentially lead to overall global environmental benefits, even though it may cause the country to appear less sustainable than its neighbours using traditional territorial monitoring mechanisms. Monitoring of the production perspective can overlook or work against national specialisation with global benefits. The current UNFCCC methods for calculating inventories and defining national targets under Kyoto, do at least give allowance for existing specialisation in energy-intensive industries for the export market since targets are relative rather than absolute (i.e. relate to the country's earlier emissions). However, they work against *further* national specialisation in GHG-intensive branches for export although this might decrease GHG emissions globally. Adjustments are made in national inventories for imports and exports of electricity, but no account is taken of GHG emissions embodied in imports and exports of other goods and services. The need to take account of such issues in post-Kyoto climate agreement have been studied in more detail by Peters and Hertwich (*in press*).

Over and above climate change agreements and mechanisms, trade and specialisation are also directly relevant in the selection of indicators for sustainable consumption and production (SCP).

As described above, the consumption perspective, although more difficult to evaluate and monitor, gives a better measure of sustainability of a country's activities when viewed at the global scale, by avoiding both the false positives and false negatives of the production perspective.

Moreover, while monitoring of national production is necessary as it allows governments to identify the need for further regulation of production processes (via IPPC, BATNEEC and seeding of new technologies through ETAP and similar initiatives), there are some indications that in Europe at least, potential for further efficiency gains in producing a given set of goods may be relatively limited (EEA, *in press*; Moll et al. 2005; The Guardian, 2007). It is certainly unlikely that the EU can achieve some of the long term goals of SCP through improvements in production cycles alone i.e. the 80% reduction in GHG emissions required from industrialised countries by 2050 (IPPC, 2007) and a halving of material resource consumption by 2030 called for by the EU parliament (ENDS, 2007). Future efforts in decoupling pressures from economic growth will need to focus more on changing the *mix* of goods being consumed by national populations i.e. focus on consumption-based measures and policy. Progress in these trends is best observed using the consumption perspective.

It therefore can be argued that future national SCP indicator sets should have their chief focus on the consumption perspective. This would include both looking at total global pressures activated by national consumption, and

also more detailed views of global value chains for individual consumption clusters.

Such a change of perspective could encourage a shift in policy, from production-process-oriented to more consumption-focused. Concerns that national production for export would as a result fall into a monitoring and policy blind-spot, can be countered. The home market remains an important consumer for most national industries; even those with large shares in export and national production processes would therefore also be captured by the consumption perspective.

The development of operational indicators based on the consumption perspective is still some way off, however. The input-output analysis method presented here can in theory capture global pressures activated by national consumption. However, the method's usefulness for this is currently limited by the boundaries of national NAMEAs. Accurately assessing the pressures released along global value chains of consumed goods would require harmonisation and linking of NAMEAs, both for the EU but also all the major importers to EU countries.

Even the *estimates* of global pressures activated by national consumption as presented here are not yet operational as regular indicators with reasonably short reporting periods. This is because they use a symmetrical form of NAMEAs which are currently updated by countries only sporadically with typically four to five year delays.

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Policy (2)

Chapter 24 Involving civil society in SCP

Deliberative processes to involve civil society organisations (CSOs) in priority setting and action formulation on sustainable consumption and production

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Abstract

Although participation of civil society is considered crucial for the implementation of ambitious sustainability strategies like the EU Sustainable Development Strategy and the SCP Action Plan, many implementation programmes and activities so far do not yet consistently involve stakeholders from this field – focusing more on business actors or researchers. To address this gap, civil society organisation can be involved via 'deliberative processes'. These can be defined as 'forums and mechanisms for involving stakeholders from civil society through information exchange, open discussions and continuous feedback on decision making on research agendas and political actions in the area of sustainable consumption and production'. This paper provides an outlook of a planned project with the aim to strengthen the involvement of civil society organisations in the formulation and implementation of European strategies in the area of sustainable consumption and production.

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme..

1 Involving civil society organisations in research and policy making

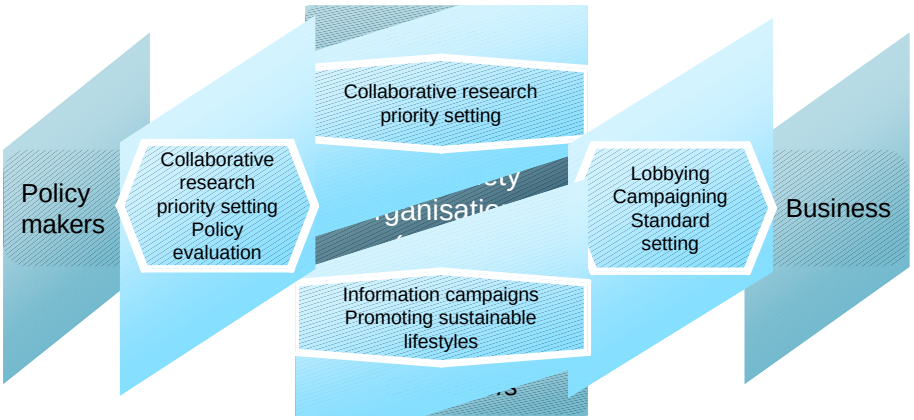
1.1 The rationale for involving CSOs

Civil society organisations (CSOs) have already proven in countless occasions how they can have an influence on the patterns of consumption and production and guide them into a more sustainable direction:

- Motivating consumers to rethink and change their shopping behaviour;
- Moving businesses to produce in a sustainable way and/or offer sustainable products and services
- Asking academia to assess the sustainability of our current patterns, and propose effective change strategies, and
- Negotiating with governments on measures to make our current patterns more sustainable.

Civil society participation is especially relevant for programmes that seek to promote broad-based and systemic collective behavioural change requiring contributions from different societal actors and sectors (UNEP SCOPE Program in the CEE, 2002). Regarding policy outcomes, the inclusion of CSOs is likely to result in a better quality of the policies, a better policy mix, a better environment for policy implementation and a stronger ownership of the policy outcomes. CSO participation in research relating to sustainability can lead to a generation of new data sources, more sensitised and knowledgeable stakeholders, empowered advocacy groups, increased accountability, and facilitate meaningful, sustainable development of research agendas and methodologies.

Figure 1: CSOs' interaction with other stakeholders



Involving CSOs in a multi-stakeholder approach (see Figure 1), including the government, the business and the academic sector (research and education) can enable these joint activities like public awareness raising and building the infrastructure for sustainable consumption and production

(SCP). CSOs can play a major role in awareness raising, information dissemination, campaigning and popularisation of sustainable consumption patterns. Some CSOs have already strongly positioned themselves on the topic through positioning and recommendation papers (e.g. European ECO-Forum, 2006).

Future efforts to involve CSOs more strongly could not only build on this more strategic work that CSOs have done on SCP, but also consider wide-spread on the ground work on promoting more sustainable patterns of consumption and production (often on very specific issues, and most often not necessarily labelled as SCP).

Attention towards SCP issues on the EU level is currently high, due to the upcoming SCP Action Plan and the attached consultation. This could present a 'window of opportunity' for involving CSOs in high-level political decision-making.

1.2 Civil society participation in the EU Sustainable Development Strategy (EU SDS)

Civil society participation is reflected in the EU Sustainable Development Strategy (EU SDS) that specifically indicates the need for the involvement of citizens as a policy guiding principle. Citizen involvement for the implementation of the EU SDS is aimed to create more ownership for sustainable development and intensify the dialogue between organisations that can provide valuable suggestions and advice on current policies related to the present and future generations.

The ECs website on the EU SDS confirms that CSOs are "absolutely necessary for changing the behaviour of individuals and the civil society". Similar principles stated in the EU SDS are:

- Enhance the participation of citizens in decision-making.
- Promote education and public awareness of sustainable development.
- Inform citizens about their impact on the environment and their options for making more sustainable choices.

As identified below, participation could be substantially relevant for the implementation of the sustainable consumption and production objectives of the EU SDS. The development and uptake of environmentally and socially preferable products and services strongly depend on concerted societal actions in different sectors of society.

Table 1: The potential role of civil society in the key challenge 'sustainable consumption and production' of the EU SDS

SCP objectives and targets	**Potential role of civil society**
Promoting sustainable consumption and production by addressing social and economic development within the carrying capacity of ecosystems and decoupling economic growth from environmental degradation.	• Develop models for raising quality of life and decoupling economic growth and promote these to policy makers • Influence debate and research on carrying capacity and social impacts and limits of economic growth • Raise public support for effective decoupling policies.

Improving the environmental and social performance for products and processes and encouraging their uptake by business and consumers.	• Co-develop criteria and certification systems for assessing environmental and (especially) social performance • Market and promote environmental and social friendly products and services • Raise awareness and build capacity among business and private consumers.
Aiming to achieve by 2010 an EU average level of Green Public Procurement (GPP) equal to that currently achieved by the best performing Member States.	• Co-develop criteria, certification methods and success indicators for GPP • Share GPP experience gathered in CSOs • Engage with governments to identify gaps and potential in GPP • Prepare pioneer products, services, markets that prove viability for GPP in new areas, not addressed so far.
The EU should seek to increase its global market share in the field of environmental technologies and eco-innovations.	• Help to identify gaps and potentials for eco-innovation from societal perspective • Engage with researchers (public and private) for co-development of locally adapted environmental technologies • Influence impact assessment and policy decisions to assure that technology exports contribute to sustainability.

2 Strengthening civil society participation through deliberative processes

2.1 The rationale for activities at the European level

As a result of globalisation, there is a need to consider the global impacts of SCP, with consumption in Europe and increasing production in the South. Moving towards more sustainable solutions will inevitably require trans-national cooperation and approaches. The necessity of establishing wide-ranging North-South exchanges to realise SCP was emphasised by the EU Presidency at the Thirteenth Session of Sustainable Development in 2005. Treating issues related with more sustainable patterns of consumption and production on the European level will have an impact on the 27 Member states and almost 490 million citizens in the EU.

While CSOs have traditionally strongly targeted national, regional or even local audiences, some of the bigger ones have internationalised their activities, targeting a global audience and participating in international forums. Targeting the European level could soon become a priority due to a number of factors:

Firstly, the creation of a common European area of commerce and free trade creates the need to address SCP on the European level. National policy initiatives, e.g. product legislation, can be incompatible with efforts to create a free flow of goods and services in Europe and have thus to be coordinated or complemented by European efforts.

Consequently, SCP is now established on the EC and Member State (MS) policy agendas (EU 2004). The broad range of existing EU policy initiatives also justifies an integrated European approach. As already mentioned, the EC included a section on SCP in the EU SDS published in 2006, and a background document on the consultation for an SCP Action Plan has been launched in 2007. SCP links to and will impact on a series of existing EU

policy initiatives and actions, among these product standards, Integrated Pollution Prevention and Control (IPPC) Directive, EMAS and eco-labelling, green public procurement, waste and resources strategies, Integrated Product Policy (IPP) and Directive on Eco-design for Energy-using Products (EuP) (Makela 2007).

SCP issues also appear in the EU Environmental Technology Action Plan (ETAP) that covers actions to promote eco-innovation and the take-up of environmental technologies through promoting research and development, mobilising funds, helping to drive demand and improving market conditions. ETAP therefore aims to harness the full potential of all technologies whose use is less environmentally harmful than that of relevant alternatives, with the goal to reduce pressures on natural resources, improve the quality of life of European citizens and stimulate economic growth This is an important mechanism to implement the EU SDS and to pursue the Lisbon Strategy and SCP Action Plan, while at the same time helping developing countries.

Companies also increasingly design products for the European market as a whole, strongly orienting their decisions on regulation issued by the European Union. This has led to a significant policy spillover in the past. Initiatives in the area of information and communication technology like the WEEE and RoHS Directives had a direct impact on product design decisions worldwide, setting a global de-facto standard for the use of certain restricted substances in high-end products. By being a 'first-mover' in taking SCP measures, Europe has the potential to influence actors in developing countries through indirect incremental interventions. Governments and consumers of these countries are already taking up European efforts for sustainable consumption. The EU RoHS legislation, for example, largely influenced the creation of the so-called 'China RoHS' that entered into force in March 2007. The European policy framework also influences other countries through the 'European Union Association Agreement'.

Apart from sustainability implications of SCP, there are key issues related to European competitiveness e.g. consumption and production of materials and energy. The Lisbon Agenda has set the goal for Europe to become a competitive, dynamic, knowledge-based economy till 2010, with de-coupling of growth from resource use having been added by the Gothenburg European Council meeting in 2001. SCP is expected to be one central strategy for reconciling environmental and economic objectives as envisioned by the Lisbon Agenda, as emphasised for example in the ETUC, EEC and Social Forum Joint Declaration for the 2007 Spring Council on the Lisbon Strategy.

2.2 Civil society participation at the European level

The necessity of civil society participation has been demonstrated by the consultative process on the SDS renewal like the Public Stakeholder Forum (Brussels, 27 April 2006) and several other non-institutionalised consultations of NGOs and CSOs in the EU-25.

Existing efforts on ETAP can be extended by incorporating the perspective of civil society. Existing networks linked to ETAP like ENVITECH-Net bring together technology-oriented research institutes without involving civil society. Similarly, the European Forum on Eco-Innovation, in support of ETAP, aims to provide decision-makers and actors

from finance, technology development, business, policy development, academia and CSOs with a biannual opportunity to discuss topics relevant to the promotion of environmental technologies. The first meeting in Poznan, Poland, (November 2006) involved stakeholders from the public sector, private companies and research, but no CSOs were represented. The Forum has ambitions for a meeting themed on 'awareness' in 2008 which will incorporate CSOs. The EU has started the consultative procedure with all stakeholders on the ETAP including CSOs at the end of 2006. This process can speed up to bring some outcomes on financing eco-innovation and contribute to the SCP Action Plan.

2.3 Elements for 'deliberative processes'

As above, the current EU processes show the low level of participation of civil society as well as the relatively low awareness among CSOs on the relevance of instruments such as EU SDS, the SCP Action Plan and ETAP. This situation could lay the ground for well-planned, open and participatory processes related to policy-making, implementation and evaluation to strengthen the role of the CSOs. Participation can be designed in the form of 'deliberative processes' for SCP, which can be defined as

> "forums and mechanisms for involving stakeholders from civil society (balanced in the EU-27) through information exchange, open discussions and continuous feedback on decision making on research agendas and political actions in the area of sustainable consumption and production" (own elaboration).

Deliberative processes thus aim at a double-impact both on research and policy making. This is a crucial endeavour in a topical field that presents significant needs both for further research activities as well as political action in a coordinated fashion. They involve activities along research and policy cycles as depicted in Table 2.

The deliberative processes that need to be designed might involve the CSOs in the stage of policy-making towards implementation of the EU SDS and the SCP Action Plan. Information exchange on future visions (quality of life, equal possibilities, sustainable use of natural resources, normative consumption, implementation of citizens' rights) and discussions on research and political actions can provide the value basis for these processes and provide the common ground for further steps.

Table 2: Elements of deliberative processes [1]

Deliberative Processes in the…		
Research Arena		**Political Arena**
Collaboratively identify knowledge gaps and research needs on potentials and necessary steps towards SCP	**«Plan»**	Participatory processes to identify priority consumption and production patterns to be addressed by public policy
'Expert' or praxis partner roles in research Involvement in programme and project governance Collaborative research projects Outreach and transfer	**«Do»**	Multi-stakeholder policy network approaches Collaborative policy implementation and enforcement Joint learning networks Awareness raising and outreach for policy measures
Stakeholder-based project evaluation	**«Check»**	Evaluate change in consumption and production patterns after policy intervention
Ensure feedback into future research agenda	**«Act»**	Identification of action gaps and follow-up

The role of CSOs in research could include review, collaborative research, and research communication and evaluation (see Table 2). CSO involvement can complement scientific research by including new factors that go beyond traditional scientific research criteria: through the inclusion of marginalised perspectives (e.g. lay knowledge), moral and ethical standards, demand for transparency of scientific processes, and placing the scientific research in a broader social context. Furthermore, CSOs can make use of scientific research evidence to broaden their knowledge base and thereby more effectively participate in policy negotiation processes. (Kuruvilla, 2005).

The deliberative processes on SCP related policy and research might also involve actors working on development issues, to include perspectives on international impacts of European patterns of consumption and production in the debate. This will help to ensure a global perspective on science and societal issues that is not simply centred on European concepts of science.

3 Project outlook: A dialogue platform for CSOs

3.1 Goals and objectives for the dialogue platform

Starting in the spring 2008, an FP7-sponsored project [2] will provide a platform for CSOs to identify research needs and design elements of deliberative processes on SCP in the demand areas of food, housing and

[1] The "Plan, Do, Check, Act" cycle stemming from management theory and applied here broadly coincides with traditional schematic depictions of the policy cycle containing elements like agenda setting, policy formation, decision-making, policy implementation and policy evaluation.

[2] The project's official title is "DelibProcessSCP – Identifying research needs and designing elements of deliberative processes on sustainable consumption and production in the demand areas food, housing and mobility". More information will be available on www.scp-dialogue.net.

mobility. It will actively involve CSOs in the establishment and running of the platform.

The specific objectives of the action are to:

- Develop material promoting the concept of SCP and displaying the status and potential in the field to CSOs. The material will contain information on previously undertaken research, the status of relevant processes, programmes and action plans (especially the EU SDS and the SCP Action Plan) and relevant stakeholders and networks (especially concerning CSOs).
- Identify and discuss patterns and sustainability impacts and factors that limit progress towards SCP in the demand areas of food, housing and mobility with the active involvement of stakeholders;
- Identify and discuss issues in the areas of finance, technology, policy instruments, capacity building and education and behavioural change as factors limiting or enabling SCP with the active involvement of stakeholders;
- Draw and discuss conclusions for the future research agenda, for the implementation of processes, programmes and action plans and for deliberative processes to involve stakeholders with a focus on CSOs and similar organisations, and
- Develop perspectives with the European Commission, the European Environment Agency and other European organisations regarding the future research agenda, the implementation of processes, programmes and action plans and for deliberative processes to involve stakeholders with a focus on CSOs and similar organisations.

3.2 A focus on food, housing and mobility

The platform will have dialogue spaces according to the three demand-areas of food and drink, housing (notably heating and construction), and mobility (notably private transport). These areas have been found to be responsible for 70 to 80 percent of the environmental impact of product consumption in the EU-25, based on life-cycle analysis in multiple studies (Tukker et al., 2006). They also relate to a series of showcases used to promote feasibility and show progress achieved under ETAP, and thus fit the priorities for the implementation of ETAP.

Addressing these demand areas thus assures that the significant priorities are addressed, and prevents that progress towards SCP is confined to niche products and markets. It addresses these three areas together to identify common drivers and barriers and draw conclusions for the research agenda and deliberative processes in an integrated fashion and increase cross-sector coherency in implementation of the EU SDS.

A similar methodology was applied at a conference on the SCP Action Plan held in October 2007 in Slovenia. This event brought together a wide range of stakeholders, discussing recommendations on a sector level and identifying common patterns relating to general patterns of consumption and production. A showcase of results is displayed in Table 3.

Table 3: General recommendations based on sector-level deliberations in the Slovenia conference (based on CSCP, RoS, EEA (2007)

Recommendations for the EU Action Plan on SCP	**Collaboration between public authorities, business and civil society and national level action on SCP**	**Recommendations for the Marrakech Process:**
EU directive on Green Public Procurement Clear sustainability targets Concrete steps to get the prices right	National visions and framework for SCP Identification and communication of the "beacons of sustainability" Environmental Fiscal Reform	Encourage the integration of SCP objectives into the policies of ministries beyond environment World-wide campaign to promote SCP Engage the public and private financing community in the Process

3.3 Methodology and tools

The key elements of the dialogue platform will be an opening and closing conference and a three-part workshop series. During these events, interactive methods (e.g. World Café, Open Space) will be applied.

The event series will be complemented by an online space (www.scp-dialogue.net), to provide opportunities for continous dialogue between the events held, and provide for interactive development of workshop agendas and background papers. The website will contain open discussion and knowledge creation spaces, especially directed at actively involving CSOs.

Also the initial run-time of the project is limited, it aims to create a long-term and continuously evolving dialogue platform, that can be linked not only to the SCP Action Plan, but also to other initiatives in the area like the ETAP.

On the side of the European Commission, the project intends to promote the establishment of deliberative processes that systematically involve civil society on a profound basis to strengthen its policy projects. For this purpose, representatives from the Commission will be involved throughout the process, and specifically in a final strategy workshop that will condense the findings of the dialogue platform and present an opportunity to discuss these with the policy makers.

4 Summary, conclusion and outlook

CSOs have a long record on pursuing projects that make current patterns on consumption and production more sustainable. These range from very tangible, concrete local projects to active involvement in lobbying and policy-making.

A stronger, institutionalised involvement of CSOs in current high-level policy and strategy making could make political strategy processes more effective, resulting in policies that allow make our patterns of consumption and production more sustainable. Building on the experiences of CSOs could help to shape initiatives to deliver real and tangible changes without creating significant unintended side-effects.

Their involvement in this initiative could also enable CSOs to pursue their objectives more effectively, building synergies between their ongoing activities and their involvement in the development and implementation of EU policy strategies and national policies.

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Chapter 25 Innovative policy instruments to promote Sustainable Consumption and Production (SCP)

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1 Introduction

The last decade has seen a shift in the interest of policy makers and regulators from the issue of production towards that of consumption. The reason for this shift is that technical innovations have been met by increased levels of consumption. We have witnessed that the environmental impact of consumption has increased in many sectors; despite substantial industrial innovation. This rebound effect (e.g., Hertwich, 2005) has not only made consumption more relevant for environmental policy, but it has led to the role of individual consumers and households being emphasised.

Sustainable Consumption and Production (SCP) has gained attention and importance since the Johannesburg summit of 2002. Participating countries were asked "[to] encourage and promote the development of a 10-year framework of programmes in support of regional and national initiatives to accelerate the shift towards sustainable consumption and production, to promote social and economic development within the carrying capacity of ecosystems, by addressing and, where appropriate, de-linking economic growth and environmental degradation, through improving efficiency and sustainability in the use of resources and production processes and reducing resource degradation, pollution and waste. All countries should take action, with developed countries taking the lead, taking into account the development needs and capabilities of developing countries, through mobilization of all sources, of financial and technical assistance and capacity building for developing countries" (UNEP, 2002b, p. 13). Based on this declaration, the so-called "Marrakech-process" started in 2003. A series of international and national dialogue-processes, roundtables and expert meetings have been carried out and will continue to go on. The European Union has made some progress with regard to Integrated Product Policy (IPP) and these activities are continuing. But, recently the attention of the European Commission was

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme.

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increasingly directed towards sustainable consumption and production. In this area, the Commission delivered an inventory of its activities (European Commission, 2004). The updated EU sustainable development strategy (Council of the European Union, 2006) introduced SCP as one of seven key challenges and committed the Commission to prepare an SCP action plan by 2007. Its publication was expected in 2007, however, during the summer 2007, the Commission decided to link its plans for SCP with the ones on sustainable industrial policy. As a consequence, the Commission launched a background document to a stakeholder consultation process on both areas (European Commission, 2007). The outcomes of the consultation are expected to be taken up in the announced Action Plan of which the publication is planned for spring 2008.

The project "Assessing the potential of various instruments for sustainable consumption practises and greening of the market (ASCEE)" is set up against this background. ASCEE is a policy oriented research activity funded by the European Union within its 6th Framework Programme. It began in February 2007 and will be finalised by September 2008. The project identifies and assesses especially innovative instruments, approaches and best practices and develops a workable guideline/toolbox for policy makers on public policy measures.

The research is divided into two phases. The *first phase* analyses policy instruments, measures and actions and experience gained in a basic instrumental overview. This first phase of the project has been finished and builds the basis of this chapter.

The *second phase* is dedicated to the dissemination of the results; including strategies for the transfer of promising approaches. Proposals will be discussed during a one-day workshop in Brussels in 29th May 2008. The discussion and results of the workshop will contribute to finalise the preliminary findings. Finally, a 'policy toolbox' and a scientific report will be delivered.

In section 2 of this chapter, our approach and some conceptual findings are described. In section 3, different instruments are presented. And finally, section 4 contains the main conclusions derived from the current state of our research.[1]

2 Approach and conceptual findings

2.1 Aims and method of data collection

The aim of the first empirical project stage, the basic instrumental overview, was to identify policy instruments promoting sustainable consumption practices and a greening of the market in Europe. The focus was on innovative policies and top-down instrumental approaches, i.e. actions and measures by European Union, national or regional governments which have already been implemented or which are still in the proposal stage. The term 'innovative' was defined in this context as either

- *new to SCP policy*, i.e. an instrument that has not yet been applied in the context of sustainable production and consumption or

[1] Parts of the paper have been co-authored by the other colleagues of the ASCEE project: Katja Biedenkopf (IES), Franziska Mohaupt (IÖW), Olof Soebech (IES), Pål Strandbakken (SIFO), and Bruno Turnheim (IES).

- *new to the country*, i.e. an instrument that is applied elsewhere but not (yet) in the country under consideration.[2]

In order not to miss any novelty, a broad approach to policy instruments was taken covering regulatory approaches such as product bans or minimum standards, economic instruments such as green taxes or subsidies, voluntary or mandatory information tools such as eco labels or energy labelling, other voluntary instruments such as voluntary agreements, information campaigns or green awards and co-operative approaches such as product panels.

Based on an interview guideline, almost 80 semi-structured (mostly telephone) interviews were conducted all over Europe during spring and early summer 2007. The interviewees were for the most part from public administrations, but also from non governmental organisations, academia and business. In particular, in larger countries with well developed environmental policies, a greater number of interviews were conducted to come up with as balanced a view as possible.

First, interviewees were asked whether there is an official policy on sustainable consumption in their countries. Second, they were asked for instruments or policy elements in their national approach which appear especially innovative to them. After that, one or more of the identified innovative instruments were selected for further discussion covering issues such as the policy context of the instrument, the main drivers for its development, the actors involved in its implementation, the dimensions of sustainability addressed, and the reasons for its success or failure respectively. In addition, interviewees were asked whether they were aware of other innovative SCP policy approaches elsewhere.

After the basic instrumental overview was finalised, case studies on selected policy instruments were conducted (see below). These case studies again were based on secondary data (literature review, internet inquiries) and primary data (interviews with stakeholders).

2.2 Findings of the instrumental overview

Although the basic instrumental overview covered most European countries and a wide array of available policy instruments, the outcome can make no claim to be complete. Besides language barriers and limited written documentation of policies and also limited knowledge of the interviewees, this is due to the fact that the main interest was into the more innovative policy approaches to promote sustainable consumption and greening of the market. Hence, by definition, this results in selective insights. Nevertheless, the overview revealed, amongst other things:

- that SCP policies are often part of National Sustainable Development Strategies that have become quite common among all EU Member States (although repeatedly lacking forceful implementation),
- that national action plans or at least framework programmes particularly addressing SCP have been implemented in a few countries, for instance, in Finland, United Kingdom, Czech Republic, and Sweden [3]; sometimes these SCP strategies

[2] This distinction refers to the distinction made in innovation research between something ‘new-to-market’ as opposed to something ‘new-to-the-firm’ (e.g., Garcia/Calantone 2002).

[3] Particularly instructive documents are, for example, the Swedish “Think Twice! – An action plan for sustainable household consumption” dealing with sustainable living, eating,

represent further developments of previous strategies dedicated to Integrated Product Policy (IPP),
- that the lack of integrated and cohesive strategies on sustainable production and consumption should, however, not obscure the fact that countries, such as Germany, Norway, The Netherlands, or Denmark employ a large number and wide range of policy instruments relevant for such a strategy,
- that for some countries, such as, for instance, Greece or Hungary, EU policies, e.g. on green public procurement or on energy using products, are the main drivers for the elaboration and implementation of national SCP policies, and
- that sustainability is mainly addressed in its environmental dimension while social and ethical issues related to consumption (fair trade, Corporate Social Responsibility) are only gradually entering the policy agenda.

These findings, by and large, correspond with other recent policy reviews (e.g., UNEP, 2002; European Commission, 2004; ETC/RWM, 2007; OECD, 2007). With respect to the instruments considered in the overview and mentioned in the interviews one can summarise
- that economic instruments, including public procurement, and voluntary (information) instruments are encountered very often, and
- that regulation, compulsory information instruments, and voluntary agreements are mentioned much less often, indicating that they are currently less strongly associated with innovative SCP policies.

In addition to these findings, the project team faced the need for further theorizing on the different categories one can attribute policy instruments to. The starting point of the research was the ‘classical’ distinction between regulatory and economic instruments, performance of governments and public institutions (public purchasing), compulsory and voluntary information instruments, other voluntary instruments and co-operative approaches. After finalising the overview a new perspective was taken addressing instruments in terms of their contribution to changing consumer behaviour (see Figure 1).

and travelling (Ministry of Agriculture, Food and Consumer Affairs 2005/06), or the framework for pro-environmental behaviour developed by the British Government (DEFRA 2008).

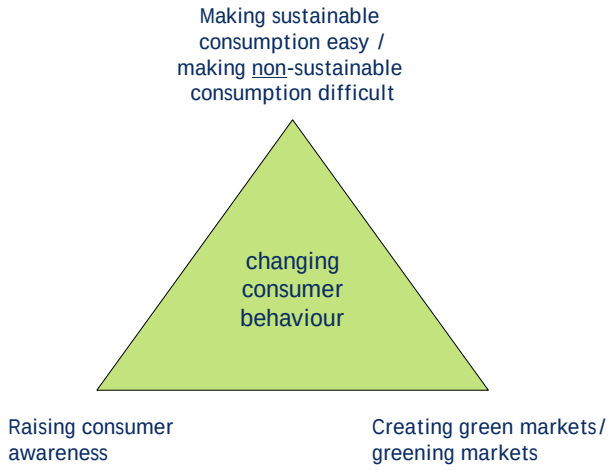

Figure 1: Three dimensions of policy induced behavioural change

In this perspective, one comes up with three different dimensions along which policy may trigger behavioural change of consumers:

- by *raising consumer awareness* with respect to sustainable consumption issues; instruments such as eco-labels, information campaigns, and consumer coaching measures (e.g., "eco teams", see below) may be assigned to this dimension,
- by *making sustainable consumption easier* or complicating or even prohibiting unsustainable consumption practices; here we find instruments that provide attractive offers to consumers, limit the range of non-sustainable products on the market or introduce congestion charges, and
- by *greening existing markets and/or creating new markets for greener products*; public procurement strategies, market-oriented product panels, or fiscal incentives are examples for this category.

Obviously, these three dimensions are not free from overlaps. Congestion charges may not only deter commuters from driving cars, but also positively influence the market for public transport services. And eco labels do not only contribute to raising consumer awareness, but they also spur greening of markets by increasing the visibility of greener products and by providing incentives for suppliers to make such offers available. However, for analytical purposes this three-dimensional distinction presents fruitful insights as the following discussion of selected instruments alongside these three dimensions will show.

3 Exemplary innovative instruments

As introduced, we looked for innovative instruments and collected a number of interesting tools and approaches. The different instruments identified can be assigned to the three dimensions of policy induced behavioural change as mentioned above.

3.1 Dimension "Greening markets"

The greening of existing markets and/or the creation of markets for greener products is one central element of SCP policies. Several instruments

can serve this purpose, for instance, innovative regulatory approaches such as the German Renewables Energy Act, mandatory standards such as minimum performance targets or an economic instrument such as so called "white certificates" (also referred to as Energy Efficiency Titles). We decided to study three selected instruments for the greening of markets in greater detail, namely

- product panels as an example of a co-operative instrument,
- technology procurement as an example of an instrument referring to the performance of governments and public institutions,
- the Dutch Green Funds System as an example of an economic instrument.

3.1.1 Product panels

Product panels are an interactive and co-operative approach among different stakeholders in order to promote, market and disseminate cleaner and more eco-efficient products on the market. They are based on learning, negotiating and information exchange among participants and perform a bridge-building function between the state and the market. "Product panels also serve as an opportunity to endeavour actively toward developing new approaches and legislative initiatives" (Nissinen and Parikka, 2007, p. 1675). They have a certain degree of freedom. Their self-regulative approach is another characteristic element.

Product panels are an introduced approach in some countries, but a series of our interviewees indicated that this approach is still promising and innovative, at least in a lot of countries. Therefore, product panels are at least new and regarded as innovative in these countries.

The idea of product panels has its origin in Denmark which started this approach in the mid 1990s[4]. It spread to other countries afterwards. Parallel to the Danish work, several other countries (e.g. Finland, Germany, The Netherlands, Norway, Spain and Sweden) and also the European Union began similar approaches, although the nomenclature differs in places[5]. Product groups with panel approaches are textiles, furniture, electronics, electronic toys, agriculture products, and building/construction for example.

In Denmark, one panel (procurement panel) is still active, whereas the others are closed. In Finland, the furniture panel is active. If we judge the experiences, most of the Danish and Finnish product panels have contributed to an increase of awareness amongst participants and also within the branch. They contributed to a moving beyond compliance. However, a greening of markets is in most cases hard to observe. One positive example seems to be the Danish textile panel, which resulted in a considerable number of companies using the EU eco-label signalling environmentally more benign textiles and a remarkable increase in consumer awareness of this eco-label.

Having analysed Danish and Finish panel work, we identified a series of supportive and hindering factors contributing or preventing successful work by product panels.

[4] See Knudsen et al. (2003, p. 11ff.) and Remmen (2006, p. 106ff.) for an overview.

[5] Besides these approaches, there exist a series of other cooperative approaches in the area of environmental policy and policy as such. Some of them are also related to product issues, like some eco-labelling competent bodies with a pluralistic composition of different stakeholders.

The composition of a panel must represent a life cycle view, i.e. represent the important steps of the value chain. Participants should be decision makers, i.e. persons who could have a real decision power, and among them at least some front running companies which really want to move things and change the market are needed. Awareness, interest and openness to new insights, discussions and proposals of committed people – an attitude of action instead of pure talk is another supportive factor. The work of product panels needs to be based on clear objectives and working rules, which should be agreed within an action plan. The carrying out of product panel must be financed by public subsidies for operative and project-oriented work.

A crucial hindering factor is the impatience of public authorities. They are keen for a short term outcome; something difficult to get from the panel approach. Also the size of national markets and the role of foreign free-riders which might not join panel work restrict the success of panels.

Product panels only work within countries with a culture accustomed to cooperation. A certain degree of common "identity" is needed to build up trust and to strengthen common approaches. Policy has to facilitate, to fund and to show a shadow of hierarchy indicating that a failure of the panel work might result in policy measures which could strengthen agreements among participants.

Panels are not an instrument in themselves. They are a procedural approach, which co-ordinates actions among participants. This means that the implementation of different measures and instruments are an outcome of a panel effort.

3.1.2 Technology procurement

Technology procurement can be considered as part of green public procurement (GPP), as a means of developing new technologies pushing innovation processes in order to develop "greener" (e.g. energy efficient, resource saving) products. Outgoing from an underlying environmental or socio-economic problem or need that has not yet been resolved, technology procurement gives the possibility of developing and demonstrating new technological solutions that are not yet available (CREST, 2006, p.15). In contrast to regular public procurement, where public institutions buy existing products and no further R&D activities take place, technology procurement occurs when a public institution "places an order for a product or system which does not exist at the time, but which could (probably) be developed within a reasonable period" (Edquist and Hommen, 2000, p.5). The aim of Technology procurement is to support the sooner market entrance of environmentally more benign products and to improve their market dissemination.

Although technology procurement is an applied instrument, it is seldom used and not widespread in European countries. Therefore it is considered as a still innovative and promising tool contributing to sustainable consumption and greening of markets.

A larger number of technology procurement projects have been implemented during the last 25 years, particularly in Sweden. Since the end of the 1980s, technology procurement has been a key element in transforming the Swedish energy system towards the increased use of efficient technologies. (Suvilehto and Öfverholm, 1998, p. 1). Between 1990 and 2005, the Swedish Energy Agency performed at least 55 technology

procurements; most of them in the building sector (e.g. windows, heat pumps, water heaters), and a few in the transportation sector (e.g. electric cars) (Suvilehto and Öfverholm, 1998, appendix 1; Stigh and von Sydow, 2007, p. 10).

The examples from the Swedish Technology Procurement Programme launched in the late 1980s illustrate the forcefulness of technology procurement [6]. They show its applicability to several sectors (housing, transport, domestic), technologies and purposes. The required performance (e.g. energy use per year or unit), was mostly surpassed with a good margin by the winner (Nilsson, 2003, p.5) and could be considerably improved compared to the best available products (between 17 and 50 %) (Suvilehto and Öfverholm, 1998, appendix 1).

An OECD report highlights the improvement of data collection and monitoring allowing an ex post evaluation as well as the identification of appropriate tools to assess the progress in environmental performance of public procurement as key areas for further improvements (OECD, 2007, p. 22). In the report, two issues considering implementation barriers were mentioned; financial and budged issues, and legal concerns.

Technology procurement requires strong government support. Environmental aspects must be regarded as important in the procurement process and linked to innovation policies. Procurement needs public finances and, with regard to technology procurement, a high-volume public demand is necessary to stimulate the product development process and to guarantee a certain turnover. To coordinate public demand, a responsible official organisation has to take the lead in co-ordinating the technology procurement process, to accumulate a large base of prospective buyers and to gain their confidence. Further flanking measures are awareness raising and information campaigns, and research and development activities.

One barrier is the time axis. Technology procurement takes longer and might be more expensive than "traditional" procurement. The lack of information on criteria and opportunities, the lack of (financial) resources within the public authorities as well as the lack of management support, information tools and training are mentioned as barriers (Bouwer et al., 2005; ICLEI, 2005).

The challenge for technology procurement lies in moving from pioneer activities to general rules of procurement. The key for its transferability lies in the combination of political appreciation for the instrument with a structural and focused information offer for public purchasers (Erdmenger, 2005, p. 21). Technology procurement is not just an issue for procurers, but many other actors need to be involved and influenced. Technology procurement must be integrated in a sustainability oriented innovation policy and the overall perspective is an important precondition in order to include the innovation potential of all policy resorts (Kuhlmann, 2005).

3.1.3 Green funds

The Dutch Green Funds Scheme (GFS) is a tax incentive instrument that has been used by the Dutch government since 1995 to encourage environmentally friendly initiatives, e.g. in renewable energy, organic farming, or sustainable housing. Investing in the Green Funds means that

[6] See Nilsson 2003; Suvilehto and Övferholm 1998, who have assessed all technology procurement projects managed by the Swedish Energy Agency during the 1990s.

individual investors – private consumers – lend their money to banks, at a lower interest rate, which is compensated by a tax incentive (environmental tax credit). The government provides the necessary legislation, supervises the banks issuing green funds or offering green savings and ensures that green projects are properly assessed against the ecological criteria set by itself. The green banks can then offer cheaper loans to environmental projects and thereby improve their financial condition.

The Green Funds, as fiscally-facilitated investments, are unique in Europe. No such scheme has been implemented in other European countries at the moment[7].

Judging the scheme, it "has had a catalysing effect on socially responsible saving and investment" (Scholtens, 2005, p. 135), and therefore can be regarded as a very successful policy instrument. The approach is convincing in that it provides a clear incentive to change to more sustainable (investment) behaviour and in that it reframes the symbolic meaning of the environmental dimension of sustainability – from environment as a threat to environment as an (economic) opportunity. By this intended side-effect, the system significantly contributes to raising awareness for ecological concerns, especially in the banking sector where sustainability has only gradually entered the agenda.

A precondition for the success of the Green Funds Scheme is a triple win-strategy: for consumers (tax deductions), for banks (reaching new target groups and satisfying social responsibility requirements) and for the funded projects (cheaper loans). This has to be arranged by the fiscal regime of the government. Consumers as the investors/savers must be familiar with responsible investment. A high(er) degree of environmental consciousness is needed to get a sufficient large size of capital mobilised.

Investors react very sensitively to any (planned) changes in fiscal policies. There were some political discussions on the scheme in The Netherlands which showed that the more discussions on the framework of the system, e.g. the amount of the environmental tax credit, the more difficult it is for the banks to assess the expected number and volumes of green project applications and of private investments respectively. Hence, such schemes will be more successful where the tax regime is fairly stable and trust between the government and the baking sector established.

The potential to transfer a fiscally facilitated green funds scheme to other countries depends upon the willingness of governments to give substantial tax advantages, the availability of money from individual investors and the need for cheap loans from a sufficient amount of green projects. The topic of green and/or social investments represents a rather progressive sustainability issue which is not yet widespread in Europe. Thus, it appears fairly unlikely that less developed European economies would start engaging strongly in this issue while other – possibly more pressing – sustainability concerns have not been tackled.

3.2 Dimension "Making sustainable consumption easy"

The dimension of *making sustainable consumption easy* uses consumer behaviour studies as a central point of departure. The instruments in this category aim at taking consumer behaviour from the level of awareness to

[7] Green Funds, however, are part of a more comprehensive discussion on (non-fiscally-facilitated) socially responsible investments (SRI).

that of action, i.e. filling the "value action gap". This may be achieved by creating an environment in which sustainable consumption is mainstreamed into consumers' current lifestyles.

The three examples chosen for further analysis are:

- TopTen
- We're in this together
- Red/Green Calculator

Additional innovative instruments identified in the research include 3rd party investors for energy efficiency, point of sales guiding systems, bonus systems, green taxes and congestion charges.

3.2.1 TopTen

TopTen is a voluntary instrument that facilitates educated consumer choices. It is an online tool that displays the most energy-efficient products, available on a range of national markets throughout Europe, and enables the consumers to conduct simple comparisons between such products. TopTen mainly addresses energy-intensive household appliances in the form of rankings of the 10 most energy-efficient products within defined product groups (e.g. refrigerators, washing machines, dryers, energy saving lamps). The TopTen initiative is run by a non-governmental institution. It benefits from active and substantial governmental support.

TopTen was launched in 2000 by the Swiss Agency for efficient energy use (SAFE). Following the Swiss success, the initiative began to spread throughout Europe. Today, 13 national TopTen sites are operational.[8]

The exact methodology for product evaluations in TopTen varies by product type. Energy consumption indexes are the dominant criteria for ranking. Additional environmental criteria, such as water consumption and noise, economic criteria, such as price, as well as product specifications, may also be consulted. Twice a year, the whole range of products is re-assessed. New products may be added as soon as the necessary information is provided to TopTen. This renders the website dynamic. It can quickly take into account rapid changes in the market.

The success of TopTen is grounded on, for example, the following set of prerequisites, and additional success factors.

- Pre-requisites: The existence of recognized labelling and/or certification structures. Harmonized product declaration requirements for producers (in this case, energy consumption mainly), provide a reliable technical information basis to performance assessment. The existence of and collaboration with reliable third-party testing and verification organisms is possible.
- Conditions that contribute to the success: The cross-national harmonization of the product declarations and labels in order to efficiently benchmark national markets. Credibility, neutrality and independence of the information displayed are crucial. A good environment for collaboration between the actors involved is necessary to strengthen the credibility of the initiative. The attractiveness, ease of use and frequent updates of internet pages assists.

[8] Austria, Belgium, Czech Republic, Finland, France, Germany, Hungary, Italy, Luxemburg, The Netherlands, Poland, Portugal, Switzerland.

Public information websites for “green” products are relatively common, but they usually address a very specialized public. TopTen tries to mobilize larger numbers of consumers through awareness raising campaigns and through a particular emphasis on win-win situations. Consumers who aim at reducing their electricity bills are a key target group.

The TopTen initiative can be seen as particularly innovative insofar as it:

- Presents simple rankings, synthesizes complex information for consumers, but involves very little information seeking from their part;
- Keeps the product databases systematically updated, thus enabling a dynamic surveillance of market developments. The flexibility is seen as a clear comparative advantage over labelling procedures;
- Has transparent and flexible evaluation methods (integrating a growing number of criteria);
- Seeks the construction of a large international network of national information websites. The formation of new national initiatives is encouraged. The resulting versatility and relative independence of the national initiatives may generate fruitful mutual learning processes, also for the benefit of the policy makers;
- Is supportive of the idea of “EU consumers” and a common European marketplace. Euro-TopTen ranks products throughout European countries and highlights their national availability.

Initiatives such as TopTen are conducive to contributing to “making sustainable consumption easy” in effective ways. Combined with the appropriate policy tools (e.g. effective, reliable, labelling and product declaration schemes, revision of labels and minimum efficiency requirements), it may provide one solution to sustainable consumption, provided that there is consumer and supply-side response to online information provision.

The diffusion of the initiative throughout European countries has so far been rather successful, although it is too early to draw conclusions. Further transfer may face significant barriers that could be overcome by strong cooperation among national initiatives, and with the harmonization of European legal frameworks.

3.2.2 We’re in this together

We’re in this together (WITT) is a campaign, a cooperative approach instrument, that is based on the voluntary commitment of companies and the general public. The emphasis of WITT is to provide attractive, practical and environmentally sound offers to consumers. This way, sustainable consumption is made easy for the individuals, which in turn, it is hoped, induces change in their behaviour.

Launched in April 2007, WITT was initiated and is supported by the UK government and run by the Climate Group.[9] The campaign was launched as

[9] Members of the Climate Group: CORPORATE: ABN Amro, AIG, Alcan Inc, Allianz Group, Arup, Baker & McKenzie, Barclays PLC, Bloomberg, BP, BSkyB, BT, Catalyst, Cheyne Capital Management, Duke Energy, Google, HDR, HSBC Holdings, Interface, Johnson & Johnson, JPMorgan Chase & Co., Man Group, Marks & Spencer, Munich Re Group, MWH, News Corporation, Pratt Industries, Starbucks, Swire, Swiss Re, Tesco, Timberland, Virgin, MUNICIPAL GOVERNMENT: Greater London Authority, New York

a 3-year programme and it is an offspring of several studies and strategic planning by and for the government. The UK government and the Climate Group are the main drivers of this initiative. Support from the former Prime Minister Tony Blair, was essential in attracting several companies to participate in WITT from early on.

Currently, there are eleven corporate partners.[10] The initiative is defined broadly, which leaves room for a variety of companies to participate, as long as the selection criteria are met.

WITT aims at decreasing the gap between consumers' sustainable intentions and actions. Carbon reduction is stated as the overarching goal of the Climate group. The website www.together.com provides a wide range of information and options on the corporate partners' offers, as well as general information on climate change. Within WITT, inbuilt indicators measure the success of parts of the campaign, and the development of the campaign may be followed on its website. The Climate group, along with the Energy Saving Trust, developed a model to calculate energy savings from most of the participating companies.

Elements that contribute to the success of the campaign are considered to be extensive background research, government involvement and support, key stakeholder involvement, flexible structure with potential for transferability, a small-scale manageable project, with simple measures to reach the consumer, large influential corporate partners, credibility of the NGO managing the project, a broad and flexible scope, open to diverse participation, interactive, a well designed information website, the philosophy of collaboration, bringing together many small initiatives under one hat, creating a whole that is stronger than the sum of its parts, making sustainable consumption easy, not demanding consumer sacrifice, providing practical solutions, providing corporate partners with guidance and assistance in developing solutions, and economic and institutional efficiency.

WITT's environmental effectiveness, compared to the intermediate goals and the scale of the project, appears to be relatively high. However, when looking at the overarching goal of dramatically reducing carbon emissions, it is unlikely that significant environmental changes will occur as a result of this instrument on its own. Some of the factors of success and the strengths also make it vulnerable. Key barriers to the campaign include vagueness of criteria for participants (may lower environmental effectiveness), vulnerability, as the initiative is dependent on the participants' dedication, management limitations, low brand recognition, other campaigns in the same field reducing visibility of WITT, and a lack of secured ongoing funding. The involvement and genuine commitment of participating companies are not guaranteed, its small-scale requires relatively low level obligations from its corporate partners and it may not bring about change in the short run.

The main innovative elements of WITT are the broad and varied collaboration as well as the approach to reach the consumer. By changing attitudes through behaviour changes, rather than the other way around, the

City, REGIONAL GOVERNMENT: California, Connecticut, Maine, Manitoba, Massachusetts, New York State, Ontario, Quebec, South Australia, Victoria http://www.theclimategroup.org/.

[10] B&Q, Barclaycard, British Gas, HSBC, More Than, National Express, O2, Sky, Tesco, The Mayor of London and M&S, all considered a major brand in the UK.

tool makes it easy for the consumers to make environmentally sound choices. It thereby has the potential to also reach environmentally less conscious consumers.

The campaign is to be launched in the USA and Australia next year, with plans to spread WITT to India and China. No major barriers to transferring the campaign to other EU member states are foreseen, provided that political will, corporate structures, companies' interests to participate and understanding of the markets remain on a similar level.

3.2.3 Red/Green Calculator

The Red/Green Calculator (R/G Calculator) is a voluntary policy tool that strives to accelerate the shift towards more sustainable product offers on retailing shelves. It provides retailers with an easy-to-use tool (database), which enables them to assess their own performance with regard to the sustainability of their product portfolio and consequently encourages them to change their offer. The R/G Calculator has not yet been presented to the public. It is currently in the final stage of its development phase and publication is anticipated for early 2008.

The R/G Calculator aims to make it easy for retailers to comply with UK policy and targets to mitigate the environmental impact of products. At the moment, it covers the energy consumption in the use-phase of a number of different consumer electronic product categories.[11] The R/G Calculator translates performance data of these products into so-called 'ecopoints'. Based on the ecopoint scores, the different products but also the retailer as a whole, are classified 'red' or 'green'. 'Green' stands for a 'sustainable' product offer and 'red' for not sufficiently sustainable products. The criteria for deciding whether a product is 'green' reflect not only the UK government's (long-term) policy targets with regards to environmental goals such as energy efficiency and CO2 emissions, but also the current product stock on the British market.[12]

The R/G Calculator contains, on the one hand, product specifications for the current year and, on the other hand, projections for the government's future targets for the coming years up until 2020. The increasingly more stringent indicative product specifications provide the retailer with a projection of which energy efficiency performance would be required to match government policy and targets in upcoming years. These future projections are valuable information for retailers' business decisions and long-term planning.

It seems that there has not been any tool like the R/G Calculator yet. In contrast to green labelling, the R/G Calculator does not use absolute criteria. It is based on relative specifications (average of stocks) and with dynamic requirements. This enables faster updating and much more flexibility. Another innovative aspect is the projection of future requirements.

The R/G Calculator is unique to the UK. Some other countries might have programmes similar to the UK Market Transformation Program's evidence base, but so far no other tool like the R/G Calculator is known.

[11] Televisions, DVD players, video recorders, set-top boxes and external power supply units

[12] The data underlying the R/G Calculator specifications are based on stock models drawn up within the UK Market Transformation Programme (MTP). MTP is a data-driven programme that "supports the development and implementation of UK government policy on sustainable products" (www.mtprog.com)

The retailing sector is in a key position. It is the link between production of goods and consumers. “It informs the end-user about product features (…) [and] in its position as purchaser and customer it can dictate the conditions of supply. It works with suppliers to encourage product development and process optimisation.” (Sarasin 2006, p. 5). The R/G Calculator enables retailers to source more efficient products and thereby to influence the manufacturing of products. And, on the other end of the supply chain, retailers also influence consumer decisions by shifting to a more sustainable product portfolio, which will make it easier for consumers to make a sustainable choice (NCC 2006, p. 1f.). Indeed, the tool will also make *un*sustainable consumption more *difficult*, because retailers are expected to remove some of the least performing products from their selection to maintain their overall scores. It is therefore expected that the R/G Calculator could have a significant impact contributing to more sustainable consumption. Yet, its voluntary character could be a limitation to its success. This remains to be seen once the R/G Calculator has been implemented for a considerable period of time.

The R/G Calculator could be expanded to other product groups and beyond energy-in-use consumption. DEFRA is currently working on including water-using products. Yet, the crucial precondition for inclusion of additional products and specifications is the availability and quality of data. For products such as food it might be difficult to design a R/G Calculator as it is much more difficult to capture all relevant aspects.

The R/G Calculator could be transferred to any other country. Yet, also for this kind of transfer the crucial precondition is the availability of good and sufficient market data. We must also take into account differing cultures and levels of consumer awareness of environmental issues. In the UK, there is a large consumer awareness of environmental and climate change issues. In such a society retailers see a benefit in providing sustainable products, as this will attract clients. Also, public pressure can be generated to influence retailers. In a society with very low level of consumer awareness of environmental and climate change issues, the R/G Calculator would not be as well received by retailers as it is in the UK.

3.3 Dimension “Raising consumer awareness”

Increasing consumer awareness is important along two dimensions. First of all, educated and informed consumers are a prerequisite for sustainable choices in the consumer market of good and services. That dimension is the main topic in this chapter. Moreover, in this discussion it is often forgotten that individuals are not only consumers, but they are also citizens. Along the political dimension user awareness is important for all sorts of political activity such as demonstrations, lobby activities, letters in newspapers, word of mouth and voting behaviour.

A substantial number of the instruments collected in the ASCEE project deals with increasing user awareness among end consumers. Many of these tools are mandatory or voluntary labelling schemes. Other deal with guidelines for carbon neutrality, various top-down information campaigns, eco-benchmarking, innovative information web-sites and eco-teams. We have decided to concentrate on three of these instruments, representing a variety of tools, namely

- information campaigns: “One tonne less” from Denmark

- a new generation of Eco teams
- organic labels in successful countries like Italy and Denmark.

3.3.1 Information campaigns: "One Tonne less"

Information campaigns and campaigns to educate consumers to change their behaviour are a frequently used tool in modern societies. This is also very common within the environmental "sector" where campaigns are used to change energy consumption, mode of transport, meat consumption or to reduce the general level of consumption. This is the case even though a number of studies and other experiences have shown that the effect of these campaigns is limited.

The Danish Ministry of Environment in cooperation with the Ministry of Transport and Energy launched the campaign "One Tonne Less" in March 2007. It is a one year campaign directed towards Danish consumers in order to reduce the CO_2 emissions from the activity of modern households.

The "One Tonne Less" campaign is an awareness-raising campaign. It aims at informing every single Dane that CO_2 emission are caused by the present way of life, and that everybody is responsible for reducing his or her own CO_2 emission. According to the campaign, this can be done without waving goodbye to the modern way of life. One only needs to use common sense, and change some of the everyday habits. The main target groups are individuals and households. Two target groups are selected for special attention: relatively "wealthy" green consumers and children and young ones.

"One Tonne Less" has developed a large variety of activities to engage consumers in the campaign. It includes a CO_2 calculator, individual advice, competition and games, exhibitions and the involvement of well-known people and artists. The consumers are guided to commit themselves to reduce energy consumption in their household. For each activity their CO_2 emission is calculated, and also how much money they will save with their new consumer habits. By December 15, 2007, 17,886 individuals have committed themselves to reducing their CO_2 emission by 19,600 tonnes.

The initiative to this campaign is taken by the political authorities in Denmark. The target groups are individual consumers, but a large number of organisations, institutions, businesses and local authorities are formally linked to the campaign. In addition, more than ten environmental NGOs take part in the campaigns.[13] Among the partners are six municipalities, including the capital, Copenhagen.

No formal evaluation has so far taken place because the campaign is still running. This means that it is difficult to make any scientific or political evaluation at this stage in the process. However, in many ways they seem to have done everything correctly. The campaign was thoroughly planned and showed political leadership. The message in the campaign was simple and the visions of the campaign were a fruitful combination of strategic and concrete measurable goals. Furthermore, target groups were identified and the necessary alliances with stakeholder were established. At last, the CO_2 calculator creates a virtual community.

However, has it been a success? In spite of all this effort, only 22,500 have committed themselves to reducing their CO_2 emission by one tonne in February, 2008. This is below the official goals of the campaign. It is also

[13] This includes WWF, Green Families, The Green Carbon initiative and the Danish Society for Nature Conservation.

striking that advice to consumers are not followed by changes in the institutional framework of individual consumer practices. One is advised to change to public transport, but public transport in the six local communities engaged in the campaign is not cheaper, more comfortable and doesn't run more frequently than before. The campaign creates a collective movement of individual behaviour, but the commitment is placed on households and consumers alone.

3.3.2 Eco-teams

The eco team is a top down method for having a small group of households change their behaviour in a more environmentally friendly direction. Analysed as an information strategy, the phenomenon makes different pieces of theoretical considerations relevant, like attitude-behaviour studies, notions of ordinary consumption and praxis theory.

In its modern form, the eco team seems to have originated in The Netherlands in the late 1980's where small groups of six to eight households participating in a nine-month programme meeting once a month in order to discuss their consumption practices. Since then, a huge number of individuals and households in a lot of countries have employed the Dutch or similar programmes. It is claimed that eco teams facilitate *increased* awareness in people of the impacts their daily actions have on the environment and that behavioural changes are long term.

The Eco Team method is developed by Global Action Plan International (GAP) and the "Eco Team" concept is a protected brand name. All Eco Teams use the same overall blueprint: 1) a start up meeting, 2) theme meetings, 3) evaluation meeting, 4) "Could we initiate new Eco Teams?" and at last 5) reports from the activities.

The first task for the Eco Team is to do the "eco-check". Each participant fills in a form, to have an idea of the environmental status of the group and to identify the potential for change. The eco-check is an instrument to be used quite a lot during the process, and the form is to be filled twice; at the beginning of the Eco Team participation, and after the process is over. This is the material that reveals the amount of change that team members have been able to achieve. It is, to a degree, the measure of Eco Team success.

The eco-check covers five main environmental household topics or consumption areas. It uses a battery of examples of behavioural acts, where respondents have to indicate how often they do the acts; ranging over five alternatives from "almost never" to "almost always". The areas are household waste, energy/energy saving, gardening/outdoors at home, purchase of food and travel.

A third party evaluation of the instrument might prove difficult. In a report to the United Kingdom Parliament, the Environmental Audit Committee claims that results from Global Action Plan supported Eco Teams in Rushcliffe; Nottingham in 2002 achieved just below 50 % savings on waste, 27 % on gas and electricity and 17 % on water use.[14] Even if we suspect that there is a certain "Hawthorne effect" present, these are impressive results.

We consider the eco team to be an easy translatable instrument between countries. With due regard to national differences, the method is adjustable to a number of cultures. In very environmentally "undeveloped" countries, it

[14] http://www.parliament.uk/parlimentary_committees /environmental_audit_committee.cfm.

might be problematic to identify solutions and alternatives in fields like energy, waste handling and eco-labelled purchase, but that would probably be an interesting phenomenon in itself. In the environmentally more advanced countries, there might be a saturation effect. People have heard it all before and lose interest.

3.3.3 Organic labels in Europe

Organic labels function both as a symbol of rational choices in the market and as a signal of political, social or environmental consciousness. The main goals of the labelling schemes are to contribute to an increase of the production, distribution and consumption of organic food. Organic labels are an information tool, designed to guide consumers in the market for foodstuffs. However, it is also possible to identify other side-effects of the labelling schemes. First of all, the development of criteria sets standards for the agricultural production of organic products and animal welfare. The criteria are dynamic and are continuously improving standards. Secondly, the labelling schemes also represent a challenge to retailing systems, and are setting goals for both small shops and large retail chains.

Organic labels are relevant for all European countries. Today one finds one or more organic labels in all European countries. In some countries, one will find a jungle of labels, while others have developed a more centralised system.

Our main focus is on organic labels in Denmark and Italy because we have identified important differences and similarities between the two countries. In both countries agriculture and food plays an important part in the economy and the culture, and they both have a substantial high profile on organic production and consumption. On the other hand, the labelling regimes and histories are different.

Denmark has a long tradition of organic farming, and over the years organic food production has attracted great attention from politicians, authorities and organizations. Effective control of the organic production has given Danish organic products a high degree of credibility. This is an important condition for the marketing of the organic products. Denmark is exceptional in having an official set of regulations and a single unique symbol for organic products, and also in that the State undertakes inspections. In general, Danes have great confidence in the State as a serious and neutral body of inspection and labelling. The most common organic label in Denmark is the so-called *Ø-mark*. This label is governmental and was introduced into the market in 1990. All Danish consumers know it and for organic products, it is an advantage to have this label on the packing.

In *Italy* the earliest pioneering experiences in organic agriculture date back to the nineteen-sixties, but only took off in the nineteen-seventies, involving more and more farmers and consumers seeking an improved quality of life and consumption. Once EU-Regulation 2092/91 was implemented, the numerous small associations of organic farmers and the producers and consumers committees operating in every region reorganised themselves, joining forces through mergers and a federative network. Today, there are 16 officially recognised certification agencies operating in Italy. In the 1990s, the organic sector in Italy showed one of the largest average annual growth rates in Europe.

Organic labels play a part in the business to consumer communications in all European countries, and have so far functioned as a successful instrument in the market dialogue between producers, retailers and consumers. What about the future of organic labels? In the European consumer market we are able to identify a large number of other relevant labels. We not only have organic labels, but a large number of fair trade and other social and political labels. To an increasing extent, we also have nutrition labels within many product categories. The recent focus on climate change has also put food miles and CO_2 emission on the labelling agenda. There are reasons to believe that all these labels, on the one hand, may increase the possibilities among consumers to choose products that respond to their wants and values. However, on the other hand, it may confuse large consumers groups, and make it even more difficult to choose in the increasing jungle of labels. There is no simple answer to this dilemma.

4 Conclusions and outlook

One can conclude from the discussion of the different case studies that public policies for the promotion of sustainable consumption have developed further during the last couple of years. Though we rarely encountered *completely new* policy instruments, we could identify some *new elements* within modern sustainability policies:

- *Collective action is key*. Campaigns like "We're in this together" or "One Tonne Less", and also the "Eco-Team" approach place strong emphasis on community-building among stakeholders and particularly consumers – thereby tackling the free-rider-problem that is expressed, for instance, in the "I will if you will" report (SDC/NCC 2006).
- *Adaptivity is crucial*. Modern SCP policy instruments have to cope with shorter innovation cycles and accelerated market pace (e.g., in consumer electronics). For instance, 'classical' eco labelling schemes are increasingly incapable of keeping up with rapidly progressing product developments. Instruments such as TopTen or the R/G Calculator are more flexible in this respect.
- *A good evidence base is essential.* Though latest scientific evidence traditionally played a role in environmental policy design (see waste management policies), it appears to become a major success factor for current SCP policies. It comprises not only technical and life cycle assessment data, but also evidence from social sciences, e.g. for proper targeting of the policy interventions (see the "One Tonne Less" campaign).

Beyond these new features of modern SCP policy, the research revealed that there is a need to balance *standardisation and flexibility* of the policy approach. On the one hand, standardisation is necessary to cope with, for example, the jungle of different product labels. On the other hand, the example of labelling of organic food in Italy showed that one has to take the national political and consumer culture into account. This may leave some space for diversity in the implementation of the instrument. It also provides evidence in support of the *context-dependency* of successful SCP policies.

One has to re-define the relationship between top-down and bottom-up approaches in a sense of *interactive or circular patterns of policy implementation and adoption*. While the focus of the ASCEE research was

on top-down government policies to promote sustainable consumption, almost all cases underline that the top-down perspective does not mean that activities, responses or feedbacks from the target groups are not a concern for the success of the tool.

In all our selected cases, the involvement of stakeholders is one of the success criteria. This holds true for the business oriented cases such as product panels, technology procurement, green funds, and the Red-Green Calculator. It is definitely also the case for the more consumer oriented tools such as the information campaigns and organic labels. But this does not mean that SCP policy should pursue a concept of self-responsibility and self-regulation. Hierarchy, regulation and governmental financial support are still necessary ingredients for successful policy. Hence, "hybrid" forms of SCP governance (Hey et al., 2007) should more strongly be dealt with in the future.

Moreover, it is obvious that a *combination of tools* is needed to reach the sustainability goals. This conclusion is not directly drawn from the cases themselves, but more indirectly from the limitations of the instruments analysed. Some of the tools have a limited part to play. They obviously need other tools to realise their potential. For other tools the limitation is more a conclusion based upon experience. Product panels are an example of the first category. Their main task is to stimulate the dialogue within specific sectors, but the final success, in terms of greening certain markets, is dependent on the performance of other tools, such as the European eco label in case of the Danish textile panel. For other tools the limitation is more a result of empirical studies and experiences. For example, the main argument against information campaigns, such as "One tonne less", is that they argue for individual change without making any institutional and infrastructural changes.

In addition, we learned that sustainability is mainly addressed in environmental terms. The social and ethical dimension of consumption, such as fair trade issues or child labour in the manufacture of goods, plays some role, but has not entered policy agendas all over Europe yet. Hence, the need to further develop current policies continues for the near future.. Proper policy analysis and also enhanced information exchange between European policy makers will be crucial for meeting this challenge.

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Chapter26 Structural and mental obstacles for effective mitigation of climate change

Experiences from Austria at the example of transport

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1 Abstract

Measures to tackle climate change are actually discussed with high intensity with the background of fulfilling national Kyoto targets. But in practice substantial improvements of the emission situation are not visible in many countries and not in Austria. This is the more astonishing as people feel more and more urgency to set effective measures and seem to be open to accept some uncomfortable consequences. But is there a real potential under the present conditions and how could measures be applied successfully?

The contribution illuminates some of the general obstacles for the necessary changes based on the commercial structure and the market behaviour, the structures of villages and last but not least in our mentality, our understanding of landuse, consumption and welfare. Some examples shall illustrate that it is not possible to change things substantially without changes in the structural framework conditions. Finally actual approaches and suggestions will be presented, which changes would be needed to facilitate the necessary reductions in energy consumption and especially CO_2 emission.

2 Background

There's a rush of events. International climate conferences, climate films, climate talks, workshops, press announcements, reminders, appeals, guidelines, decisions, we hear and read all that and daily more of it.

2007 might be marked in future as the year when the global public with frightened listening got aware of the climate change (after-effects of the "Stern Report", peace Nobel prize for Al Gore and the IPCC, the publication of its fourth assessment report, the summit in Bali).

After many years of denying rising atmospheric temperature now the increasing number of climate related accidents and devastations caused by storms, floods, etc. led to a change of awareness in every level of the society,

Proceedings: Sustainable Consumption and Production: Framework for action, 10-11 March 2008, Brussels, Belgium.Conference of the Sustainable Consumption Research Exchange (SCORE!) Network, supported by the EU's 6th Framework Programme..

which is supported by a global discussion of the climate phenomena launched by international experts and scientists.

3 Emission development

1997 the European Union and its member states have committed themselves in Kyoto to a reduction of greenhouse gases of about 8%. The reduction target was shared among the member states with respect to their reduction potentials and their different pre-conditions (burden sharing agreement).

On Jan 10th 2007 the European Commission has adopted an energy and climate package. It includes the obligation of lowering the greenhouse gases at least by 20 % (in relation to 1990) up to 2020 and to increase the percentage of renewable energy up to 20 % including 10 % biofuels in this period (EU-rapid memo/08/34). On Jan 23rd 2008 specific goals for the member states have been proposed.

In the recent years all European countries have developed strategies comprising a lot of measures to mitigate climate change mainly by reducing energy demand.

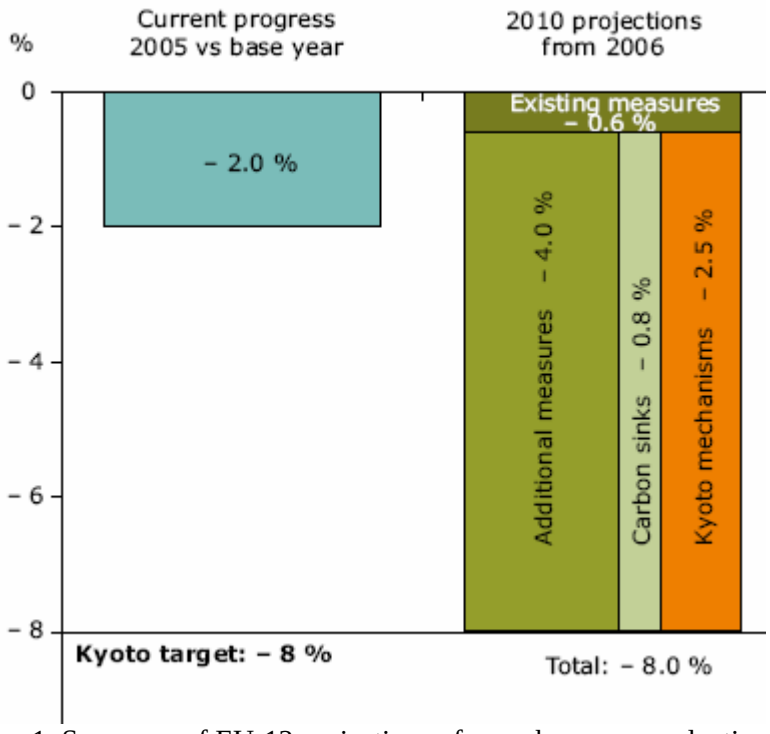

Figure 1: Summary of EU-12 projections of greenhouse gas reduction by 2010, Source: EEA 2007

Despite of the numerous measures that have been established to reduce emissions, many of the EU-15 countries show still a significant deviation from the target path, whereas the EU-total including of the new member states is right on track (Figures 1 and 2).

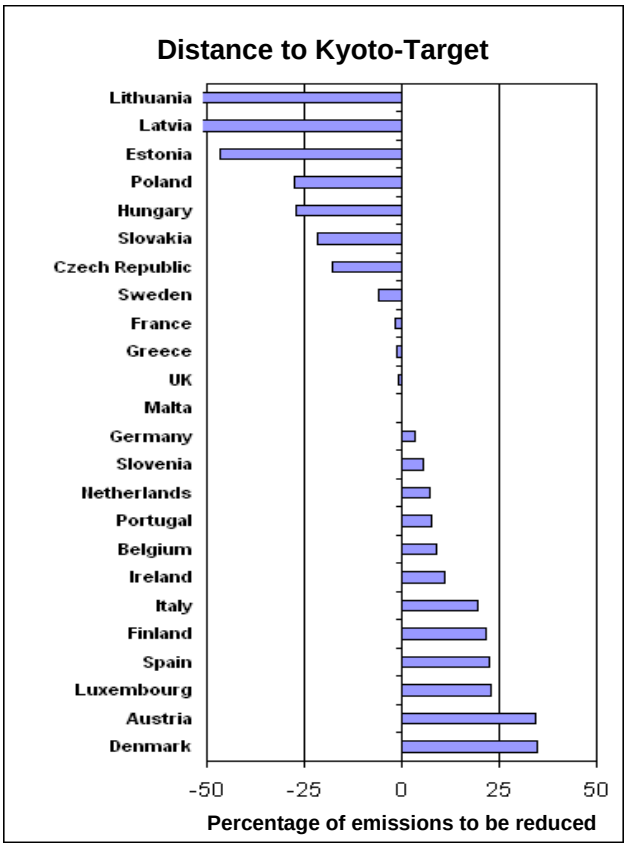

Figure 2: Distance to target indicator for EU-countries 2005, Source: Innovation und Klima, http://www.innovation-klima.at/topics_neu/eu_vergleich.htm

In Austria the first Climate Strategy was worked out in 2002 (BMLFUW 2002). Evaluations of the Austrian activities since 2005 have shown that Austria has not got closer to the Kyoto target during the last years.

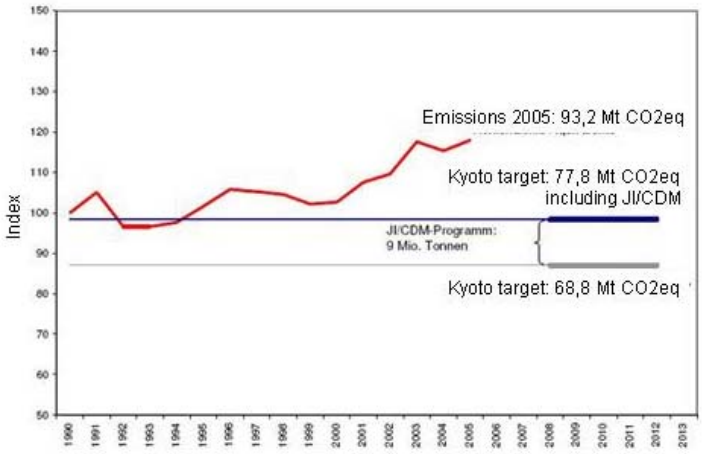

Figure 3: Development of Austrian´s emission of Greenhouse gases (Index 1990 = 100), Source: BMLFUW 2007

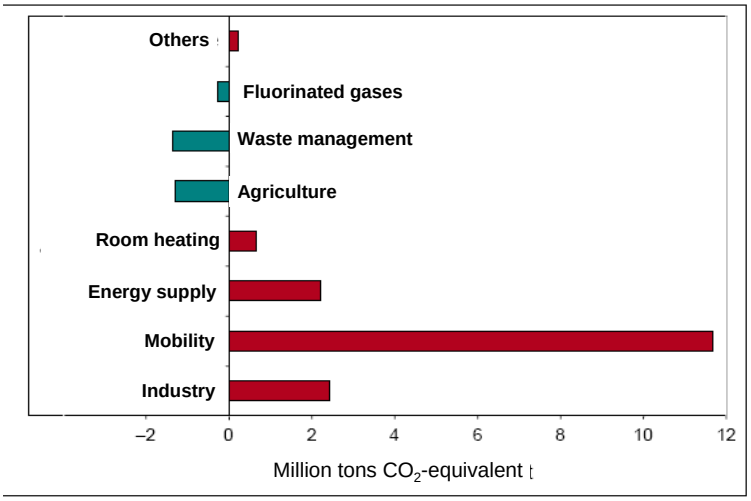

Figure 4: Development of Greenhouse gas emissions from 1990 to 2005 and contributions of the sectors in 2005, Source: UBA 2007

The first Austrian Climate Strategy was updated last year according to the experiences already made (BMLFUW 2007). The major types of measures considered in this adaptation are listed below:

- Use of new technologies
  – Increasing energy efficiency
  – Fostering renewable energies, provision on regional level
- Fostering new technologies that contribute to a sustainable reduction of greenhouse gas emission
- Increase of effectivity of emission trading and of flexible mechanisms of JI/CDM programme
- Mutual action on national, regional and local level

Contrary to many ambitious intentions of the last years positive developments are only visible in the smaller sectors waste and agriculture. A stabilisation seems to occur in the sector room heating, but especially the emissions in the important transport sector are continuously increasing. In this contribution we will consider mainly driving forces in this sector and try to identify obstacles for the needed reduction of energy demand in transport, but also in the related energy and production sectors.

3.1 Transport and increased mobility demand

In the transport sector the reduction of energy use seems most urgent due to the high rate of its increase. In fact transported distances of goods and persons rise continuously and provoke more traffic every year.

The development of the car with its availability and its numerous advantages brought flexibility, transport capacity, convenience and fast and easy access to far places. Therefore the car had become an indispensable object of everyday life. Infrastructure and habits are adjusted to the functionalities of this means of transportation, starting up a vicious circle of more traffic and more traffic-requirements resulting from a disaggregation of functional structures.

Disadvantages like dense traffic in cities, injuries and mortal accidents, bad air quality and noise have been neglected or ignored for a long time due to the complexity of the problem and controversial views in the population. The missing of targets in mitigating greenhouse gas emissions is highlighting the development in the mobility sector once again as one major cause of problems for climate and also life quality in urban regions (Umwelt Management Austria 2006).

None of the mentioned processes is unknown, nevertheless they are not really tackled by the present reduction measures and therefore should be addressed here once more.

3.1.1 Settlement structures

Due to the decrease of life quality in urban areas and the prosperity in urban regions people try to improve their standard of living and housing. Many of them transfer their accommodations to the periphery of cities or to rural regions. The increased mobility using the car allowed settlement in remote places, where many single family houses are built. The desire of many citizens for a cottage leads the communes to designate hillsides and valleys as building sites. These new settlements bring direct revenues from selling the former farmland and benefits for the communal budget because of financial subsidies for every inhabitant. In many cases no public transport facilities to enable inhabitants to reach the municipal centres and the major public transport routes without car are provided.

The ongoing deconcentration of the functional structures, the separation of habitation and work, but also the lack of shopping and service facilities in the neighbourhood have led to a sharp increase of the travelled distances. Suburban shopping malls offer a high concentration of different shops, equipped with huge parking areas. Moreover they bring jobs and taxes for small communal budgets. On the other hand this development contributes to the diminishment of shopping infrastructure in the centres.

The daily distances are mainly driven by car because of the fact that public transport in rural regions is generally more time consuming and not equivalent in availability, flexibility, etc. Public transport to shopping malls is available in some cases, but in practise our shopping system with the necessity to carry home the purchased goods complicates definitely shopping with bicycle, bus or train.

Actually in rural regions the individual motor car traffic has become a fundamental necessity. Driving its own car to satisfy the daily requirements like commuting to work, procurement, private services and social contacts has become quite normal and often essential, so that partly upcoming but punctual approaches of public transport services are mostly ignored.

3.1.2 Production structures

Looking for opportunities to cut costs companies expanded their production chains all over the world. This is a clear indication for transport being too cheap the more as it is subsidized directly and indirectly in many different ways. The low transport costs have led to a disaggregation of production chains and multiple transport between the single processes situated far away from each other. Today the transport of intermediate

products to the far eastern countries for simple sorting or washing steps is economically feasible. Some years ago the history of a yoghurt that travels through Europe during its way from the cow to the fridge provoked some rethinking processes.

Nevertheless the measures taken to promote regional products focused on consumer habits without changing basic economic driving forces. The free trade paradigm directs economy towards globalization, if the incurred costs of transport are far lower than the real costs including the external costs. Therefore the internalisation of external costs would be needed to foster a regional concentration of production systems.

Globalized production chains allow to cut costs so they contribute to low cost goods. A low cost and waste mentality of consumers supports this development. Cheap goods are not produced in order to be used for decades. Product life becomes shorter and shorter and critical voices complain that most of the goods are almost produced to end as waste with a very short phase of use.

A secondary effect of short life time and enhanced one-time use of products is the reduction of repair infrastructure. Product performance develops very fast and it is almost not feasible to stock spare parts. New products are relatively cheap, repair needs expensive manpower, so maintenance and repair of household and small office equipment is hardly feasible today. Buying a new product and wasting the old one is mostly the exercised option.

So we buy and waste lots of things and contribute herewith to economy of scale and profit from low prices for luxury goods. But is it really our mentality to perceive welfare as the possibility to buy a lot of nice things? This consumption behaviour is well supported by the present commercial system, the major trade and production companies. Today there exists a high availability of luxury goods we never had in history before. Most of us have the chance to buy lots of nice gadgets, helping us in every day life and offering functions we do not really need, but we do enjoy. On the other hand purchasing power is needed to support the commercial system, otherwise the economy falls into a recession. Low or zero growth rates could threaten our wealth and would lead to social problems.

Luxury goods are also often a visible sign for welfare and those who cannot afford them are dropping in social status. This is another driver for consumption with social relevance, as it causes social problems from leverage and social division between people who can afford luxury and those who cannot.

The implication of this development is the increase of produced amounts. But the more goods are produced, the more material and energy is needed. More raw-material provision needs again more energy and more transport. Although our production system increases its efficiency, e.g. the specific energy consumption, the specific raw material consumption per output unit drops, but an increase in the absolute figures of energy and raw material input and in the transported distances as well is evident. Solutions therefore need new commercial models and new awareness as it is suggested in chapter 4.

3.1.3 Lifestyle and products

But each of us has an impact on these developments. In fact we can influence the design, function and efficiency of technical products with our purchase decision.

Product development usually aims at an increase of functionality but also in efficiency. This can be illustrated by the fuel consumption of cars which has dropped from more than 10 before 1980 to less than 8 litres per 100 km in Austria now. So the efficiency increase of the technical equipment could be a chance to reduce the negative effects of more use. But we have more cars, drive more and especially longer distances. The majority of us can easily afford the costs of driving a car and we appreciate the comfort and flexibility. And in fact we see an increase in efficiency, but only concerning specific figures. The total absolute figures show actually no positive over-all effects, the amount of consumed fuel is increasing continuously.

The technical improvements in efficiency are over-compensated by our habits on the one hand and by convenience, prestige, energy consuming additional features on the other hand.

Figure 5: Really advances from development?

Instead of a clear priority for efficient products the average car has increased its weight simultaneously to the continuous efficiency improvements of its machine. Presently cars are equipped with a lot of comfort and safety devices leading to much more weight and more powerful machines, which offset substantial improvements in efficiency. Moreover, the selling rates of heavy-off-road vehicles are growing. These SUVs are especially favoured by citizens. This fact indicates that lifestyle dominates consumer decisions without considering the real necessities. In many of our currently used products only a small part of the possible efficiency benefits remains, sometimes technical innovations and development trends even run in the contrary direction. Such trends are obvious not only in traffic, but in many fields of our life. Wide angle plasma TVs are more than doubling the energy consumption of old TVs, mainly due to the increased screen area. Laundry machines indeed consume now less energy than the older types but come along with energy intensive laundry dryers.

A further example for progress and its compensation is the positive thermal insulation of buildings, which has the potential to reduce heat demand up to 90 % and even more at individual objects. Presently only a small share of the potential could be realized in practice as the improvement of building infrastructure needs decades. The living space has increased from

15 m^2 per person in 1950 to more than 40 m^2 (Twaroch 2003, Windsperger et al 2008) today and compensated together with a higher room temperature and a higher share of heated rooms the positive effects. Moreover the popular air conditioning, but also a lot of devices for additional comfort imply electricity consumption and contribute herewith to the presently observed rise in electricity demand.

Although the efficiency of the products has been improved, we finally face an increase in the absolute figures of heat and electricity consumption in our economy. In many cases the efficiency improvements are out weighed by additional functions and features, directed towards safety, but also comfort and luxury. This fact finally leads to equal or even more energy consumption.

3.1.4 Framework conditions

Prevailing market conditions are obviously not suited to prevent the mentioned problems. These conditions are set by policy and build the frame for the activities of and in a state. Political decisions are made by the representatives of the public groups, due to the interests of their group. Political ratio is influenced by our wishes and dreams of welfare and quality of life on the one hand, by mighty interest groups like world wide holding companies or big national stakeholder groups on the other hand. Therefore policy decisions sometimes seem not to be based on scientific rationality and causality but the deviations come from the constraints above.

Generally political decisions try to preserve and improve the actual situation and to avoid change of existing structures. Present ways are continued as long as possible as changes generally provoke resistance of some groups. Under these preconditions achieving wide ranging system changes is an enormous challenge even as they might be necessary.

3.1.5 Summary

The following figure shall summarize the presented drivers and developments and illustrate their interdependencies. Most driving forces affect transport directly, maybe the reason for the clear negative development in greenhouse gas emissions of this sector.

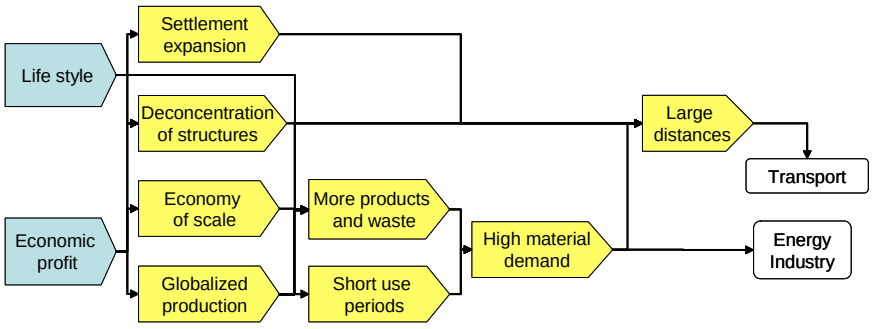

Figure 6: Exemplary influences of driving forces and effects on transport, energy and industry sector, Source: authors

4 Suggestions for improvement

Energy saving measures have to take these structural and mental obstacles into account and may influence them. The examples above show that it is not sufficient to tackle single effects, integrative strategies for a systematic change would be necessary to achieve substantial improvements.

To reach substantial effects the scope of the measures must go beyond single transport means. We need an attractive mixture of means of transport, which can be adapted to the situation in urban and rural regions. The requirements of sustainability are met best by: walking – cycling – using public transport. Hereby the public transport should be privileged over individual traffic in urban regions and supplemented in an optimal way with demand oriented public means in more disperse settled regions. Attractive economic conditions, acceleration of public transport, adjusted time tables and a lot of other already mentioned improvements would be needed for acceptance and high utilisation.

To achieve the objective of a sustainable transport system successfully an adequate settlement structure would be required. It should be developed by regional planning and should consider the needs of the inhabitants more than these of the cars. One attempt is the concept of the “city of short distances” (www.oekostadt.at). The city is built up of settlement units designed for such a number of inhabitants (up to 10.000) that on the one hand the arrangement of economically feasible facilities for all essential service functions it permitted (lower limit), on the other hand the accessibility of all these facilities by foot can be guaranteed (upper limit). A well-balanced mixture of different service units is a factor of success. But the offered high spatial concentration of flats, working places, stores and leisure facilities must be also accepted by the people.

Such future strategies should of course use low energy building and passive house concepts with integration of solar and sustainable architecture to house the inhabitants to their convenience. Moreover village structure and architecture should be embedded in the landscape and sound with historical landscape development. Of course the existing structures cannot be changed in short term but financial incentives for communities to apply such concepts of mixed functionality and sustainable transport would definitely help to direct the development step by step to a reduction of the dependency on motorized individual mobility.

Another opportunity to reduce traffic, especially that for commuting to work, results from the upcoming information society. It offers new, flexible work styles including telework, which can be regarded as a typical example. The most conspicuous advantage is the transport of information instead of transport of persons with imaginable positive consequences for mobility and time demand. But one must be aware of the possible adverse social consequences. High motivation and a broad task variety are linked with time pressure, conflicting work demands from tight deadlines and long working hours. When disconnected from supportive networks, ambitious teleworkers will have difficulties in setting limits to their workload and in mental recovery. Such approaches offer of course high potential, but should be considered carefully to avoid extensive social problems.

In addition to concepts of new city structures new shopping concepts for purchasing every day goods are needed, which dematerialize the purchasing process for the client. Shopping can be done on site in the shop, but the purchased goods need to be transported to the accommodation of the client with transport service. Interfaces for storing the goods under appropriate conditions at the home of the client until he returns are needed to be developed. Under these conditions shopping would be comfortable and practicable even by bicycle or public transport. Online shopping via internet or TV are similar approaches with increased popularity and can be seen as supplements. They are rather ultimate solutions in using information technology for making the choice at home. This would avoid the travel of the clients but also their visit of shops and service offices that contribute in making cities comfortable. Dematerialized shopping still would use salesrooms and offices but they could be situated in the city centres as no car parking and transport of goods is required. The warehouses and magazines could remain at the periphery but would be accessed by the transport services only. The provision of daily goods could herewith be provided with less individual car traffic, more efficiency of the transport process due to higher packing density and better logistics and more comfort for the client.

Besides the question how we procure it is important which goods we buy. The consumer and producer practices should be changed from

- Production and consumption of as many products to the lowest price as possible

To

- Quality products at a reasonable price with adequate life time for reasonable use

Higher prices would allow the producer to shift from economy of scale to a less resource intensive production of individual quality products with a higher share of manpower in production. Due to optimal function and longer lifetime of the products the client should not spend more money for the requested function. A lifetime accompanying service could be included in the purchasing contract of many products as a supplement. This would mean a high level of risky producer responsibility, but would lead to more customer loyalty. Such approaches would be appreciated from the clients at least for most of the electronic equipment and on the other hand it would stimulate development of service friendly products. However, market conditions which are able to support these types of consumption models are needed.

Such changes in the consumption pattern could be further extended to advanced commercial models like Product Service Systems (PSS). They focus on selling the service instead of selling products and represent the closest relation between producer and client. They allow decoupling of the added value for the producer from selling the products. The producer, being then the service partner, will in contrary profit from a reduction of material consumption. If this model is applied in a responsible way both sides will benefit, as it is the experience of many contracting and service models, which are rather common in industry than in private consumption,.

Of course such product-service approaches would mean severe changes in our way of life, especially in the perception of our wealth. It means a transfer

- from owning goods to using goods.

This would concern mainly products which we actually see as luxury symbols and which are not bought (and used) with rationality. Taking a service model, we would primarily get products which are reasonable for fulfilling our need better. Contrary to popular prejudice it would allow to meet our different desires as we could change the products more easily (a car for every day, another for holiday, another for representation purpose,…). This would facilitate to apply the technical development for a real efficiency increase (small car for every day use), as we would not need to buy the "biggest" solution and suffer every day from its high fuel consumption.

Additionally a stimulation of new values would be needed, more fun with less energy. The use of efficient products in an efficient way should be promoted with marketing methods. Of course such a change in mind setting is difficult when the surrounding shows us the endless possibilities of consumption without any boundaries. All developments for efficiency are herewith thwarted. On the other hand is efficiency really mainly driven by scarcity? We always tried to overcome scarcity with technical skills in the last decades, however, we expect it for crude oil in the near future. But now problems emerge earlier from the output side, the accumulation of CO2 in atmosphere, than the scarcity of crude oil will strike us.

If lack of limitation were a core aspect, framework conditions could be set by policy to create limitations. The main problem is to find a social balanced way which is accepted by the people and which avoids too heavy disorder in the commercial system. A strategy for a synthetic adaptive change is required. Such a strategy should not aim at sufficiency principle but redirect the technological development and the consumer behaviour to efficiency increase. The alteration would be the loss of our self-understanding of welfare as the increased access to nearly everything. But increased efficiency should allow us similar comfort and fun with less energy and would definitely help to prevent possibly harder effects which we are probably facing in the next years when we continue our present way.

5 Conclusions

The today's industrial society welfare is based on consumption, the production system is optimized and globalized, economy of scale enables mass production to produce affordable goods which end consecutively very soon as waste. A vicious circle developed: without mass production no scale yields, therefore rising prices and less consumption and at least less revenues.

Therefore, a rebuilding of society according to the principles of sustainability is suggested by Stahel 2000, it causes a new thinking in the sense of a "performance society", prioritizing which the value preservation. The functional value would serve as the central value, therefore the management of goods and not their substitution has highest priority. Provided services should be the basis for payment and not the means which are necessary for the service provision. If service is paid, every system inefficiency is a loss and will be minimized. Hence, engineering for damage

prevention will develop as the new economic goals, substituting the present maximisation of production.

Actually we see in many developments an increase of energy and resource efficiency, however, the absolute consumption of energy and resources increases. A modest and responsible utilisation of resources at the utmost efficiency should be favoured, above all, for the use of biogenic resources as they are most important in a renewable resource based economy. A cascading of raw material use, reutilisation of used materials, synergies between the material production and the energy sector should be exploited. Of course a switch to such a system cannot be achieved short term, but the conditions should be set to favour a development in that direction at least at a long term perspective.

Besides the issue of resources the provision of electricity, which gets increasing importance in future through many measures, so reduced heat demand of building results in more electricity consumption (e.g. passive houses, heat pumps,…), will become crucial. Therefore the provision of solar based electricity in a sustainable way must be pursued. As the energy density of solar radiation is very low compared to conventional energy carriers and distributed over the earth, decentralized production systems are absolutely necessary to use significant shares of the potential. The collector systems must be widely distributed, situated on buildings, fences, etc and capable to feed electricity to the grid at many points.

Unfortunately the actual development shows opposite trends, the number of decentralized plants e.g. biogas conversion plants dropped in the last years due to economic conditions. Such development is also a set back for the photovoltaic market and impedes the technical development for the needed efficiency increase of the collectors.

So policy should set the necessary framework conditions to direct the public economy to a system change towards effective reduction of resource and energy consumption in a smooth adaptation process without loosing economic power and welfare. The necessary changes will be the more accepted and understood the more transparent the way of the change is presented. Moreover an appealing but also realistic vision of a desirable future of living and welfare is indispensable for getting drive in the necessary system changes.

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